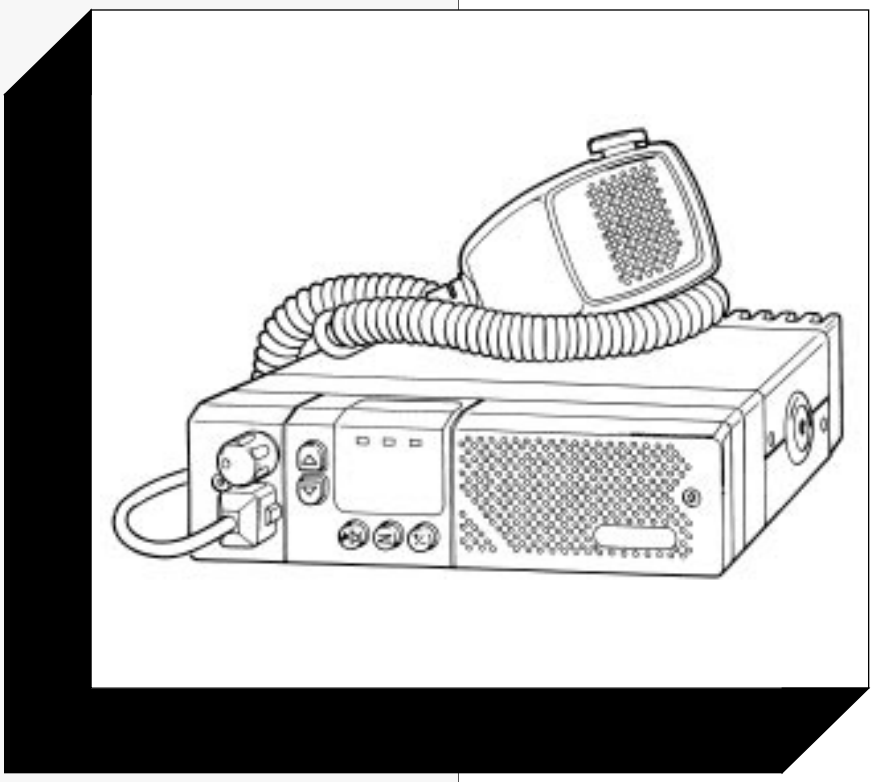
Radius GM300

Mobile Radio

The Dealer's Radio Service Software Manual



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Radius Products Division
1-800-356-1520 (U.S.)
319-385-5395 (Outside U.S.)

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Radius Products Division
Hwy 34, West
Mount Pleasant, IA 52641
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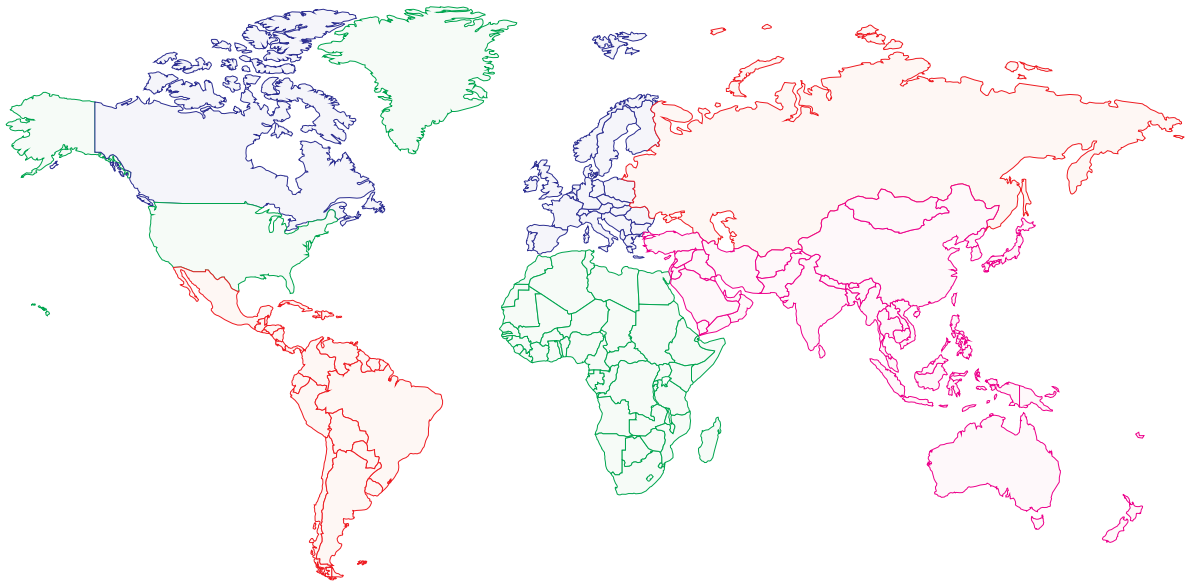

...and the following manual contributors:

Earle L.	Pam S.	Mark N.
Nancy A.	Rafaela R.	Mike R.
Amy H.	Jim K.	Clint L.
Kim P.	Joe C.	Mike C.
Joe P.	Paul B.	Christine C.
Craig C.	Larry Y.	Bob B.
Rick R.	Al M.	Mark G.
Rod B.	Kim L.	John O.
Kathy C.	Janice B.	Heidi H.

Thank you for your contributions!

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1 Introduction

1.1 Overview

Welcome to the world of two-way radio programming from Radius a division of Motorola. This manual is targeted for anyone who wants to program features into the Radius GM300 mobile radio. This feature programming, or customizing, personalizes a radio for an individual customer's needs, resulting in radios with unique “personalities.”

The Radius GM300 series of mobile radios has a unique set of features, including:

- ❏ Programmable accessory connector
- ❏ Unique PL/DPL codes for each channel
- ❏ Signalling capabilities with the RapidCall Signalling system
- ❏ Channel scan
- ❏ Maintenance-free tuning, due to the wideband capability

This feature set makes the Radius GM300 an ideal radio for commercial businesses and police and fire protection services that typically use radios in their service vehicles.

How can Radius design radios with such a wide range of features and still offer radio servicers the ability to customize and personalize radios? The answer is in the modern microprocessor chip technology in the radio and the use of Radius' Radio Service Software (RSS) - a computer program that, when interfaced with a radio, electronically programs and personalizes a radio with a unique set of features for each individual customer. The RSS program is found on the diskettes included with this manual (Package HVN8177).

Note: No tools are needed to use the RSS program.

1

The following are some of the features and functions available when using the RSS program:

GM300 RSS Programmable Features	GM300 RSS Service Functions
Transmit (Tx) frequencies	Reference oscillator alignment
Receive (Rx) frequencies	Transmit deviation alignment
PL/DPL codes	Transmit power alignment
Signalling system parameters*	Replaced power amplifier calibration
Scan lists and scan options	Replaced logic board calibration
Accessory connector definition*	Replaced RF board calibration

(** 16 Channel Model only*)

Figure 1-1. RSS Programmable Features and Functions

This radio customizing and servicing is accomplished by using a standard IBM-XT/AT (or compatible), IBM convertible, or System/2 Model 30/50/70 computer.

Note: Prior to purchasing a computer, we recommend you test any computer's RSS "compatibility" by connecting all the hardware, installing the software, starting the RSS and reading and writing data to and from a radio. If problems occur, call the phone number on the front cover for help.

1.2 Prerequisites

To use RSS and to program the radios, we recommend a basic working knowledge of the following:

- ❏ Microcomputers.
- ❏ Microsoft Disk Operating System (MS-DOS), version 3.2 or later.
- ❏ The radio's available features (see Feature Chart in Basic Features section),
- ❏ The GM300 Study Guide, and the GM300 Operator's Manual.
- ❏ Your customers' needs.

For computer beginners, we shall teach some computer and DOS basics. However, this manual is written for both beginners and advanced users, so the primary prerequisite for using RSS is the desire to program and deliver an excellent radio to your customer.

1.3 Using This Manual

This manual is designed to teach basic feature programming and to speed up access to technical reference information. It is intended for both beginners and advanced users of computers and RSS. To speed up access to the information, we've included key words in the page headers, numerous tables and lists, and a revised Table of Contents and reference sections. To help you better understand the information presented, we've expanded the Getting Started section, Glossary and Abbreviation list, and added a Tutorials section to get new users started faster. The table below lists suggested ways to use this manual.

Table 1-1. How to Use this Manual

First Time User	Occasional User	Frequent User
1. Read the *Introduction* section	1. Review *Getting Started* to set up the hardware, install, start or move around in the RSS	1. Decide what features you want radio-wide and permode; write them down
2. Read and do the steps in section 2, *Getting Started*	2. Decide what features you want radio-wide and per-mode; write them down.	2. Decide whether to start from scratch or to clone from an existing file.
3. Do one or more of the tutorials.	3. To add more features to a radio, either read in a archive file (see the Cloning tutorial, in Section 3) you previously saved, or redo the steps in the first tutorial, then for each additional feature, use the *Reference* sections to program the feature	3. Use sections 1, 2, 3 and the appendixes only as needed
4. Use the *Glossary* for terms and abbreviations you don't understand	4. For adding scan features, review the *Feature Chart*, and use the *Reference* sections as needed	4. Find most of your information from Sections 4 through 8 (Fanning or thumbing through the *reference* sections may be all you need.)
5. Know the phone number of a frequent user or Radius technical support (see Table 1-2)		5. To install an RSS update, refer back to Section 2. For servicing, see Section 8.
6. Do another tutorial within 48 hours of the first one for better memory retention		

The page layout and type selection is designed to speed up access to the information and to provide visual clarity and distinction between certain types of information.

- **Headers**

  The header area (top) of each page shows the name of the manual on the inside edge of the page and a section and subsection name on the outside edge of the page.

- **Footers**

  The footer area (bottom) of each page contains the page number on the outside edge of the page and the manual number on the inside edge of the page for easy identification if a page becomes separated from the original manual.

- **Type Styles**

  Keyboard keys and words typed from the keyboard are shown in bold font. RSS menu and screen names are shown in ALL CAPITAL LETTERS RSS field names (features) are shown in Initial Capital Letters.

- **Tables**

  Tables are used abundantly to list steps and procedures. A table is anything contained within a box with vertical or horizontal lines through it. Shaded tables apply only to procedures for diskette use and not for hard disk use.

- **Figures**

  Figures can be drawings or pictures of hardware and equipment, screen-captured images of RSS menus and screens, or computer-created graphics.

A stop light represents an important warning.

1.4 Subscription Information

Your RSS is part of a subscription. We shall keep you advised of changes and automatically mail revisions throughout the life of the subscription.

A subscription is good for one site. Under the terms of your subscription, you may install the RSS on as many personal computers as desired at that one site. Another site location requires another subscription.

When contacting the Radius Distribution Center for your region of the world, you may need to reference your subscription model number. See Table 1-2 below for your region and model number.

Table 1-2. Subscription and Support Group Numbers.

Region/Location	Subscription Model Number	Support Group
Japan	H5106	
U.S.	H5028	Radius North America Distribution Center, 1-800-356-1520
Canada	H5041	Technical Hotline Center, 1-800-663-1771
Australia	H5044	
Europe	H5114	Local Radius Dealer*
Germany	H5133	Local Radius Dealer*
Rest of world	H5030	Radius North America Distribution Center, 1-319-385-5395

** Your local dealer has access to Motorola technical help.*

2 Getting Started

2.1 Overview

In this section you will identify, install and learn to use the necessary hardware and software to run RSS. You will become familiar with the computer, the keyboard, RSS menus, screens and fields. This section prepares you for Section 3 - Tutorials, in which you will actually program a radio.

If you cannot complete this section at one time, we recommend you first set up the hardware (15 minutes). As time permits, continue with the remaining second-level subsections, finishing one second-level subsection before allowing an interruption. Most of the second-level subsections can be read in 15 minutes. Actually starting RSS only takes a few minutes for a first-time user, but the exploration of the menus and screens can vary from user to user.

2.2 Assembling The Hardware

Figure 2-1 below shows the required and optional equipment to program a radio.

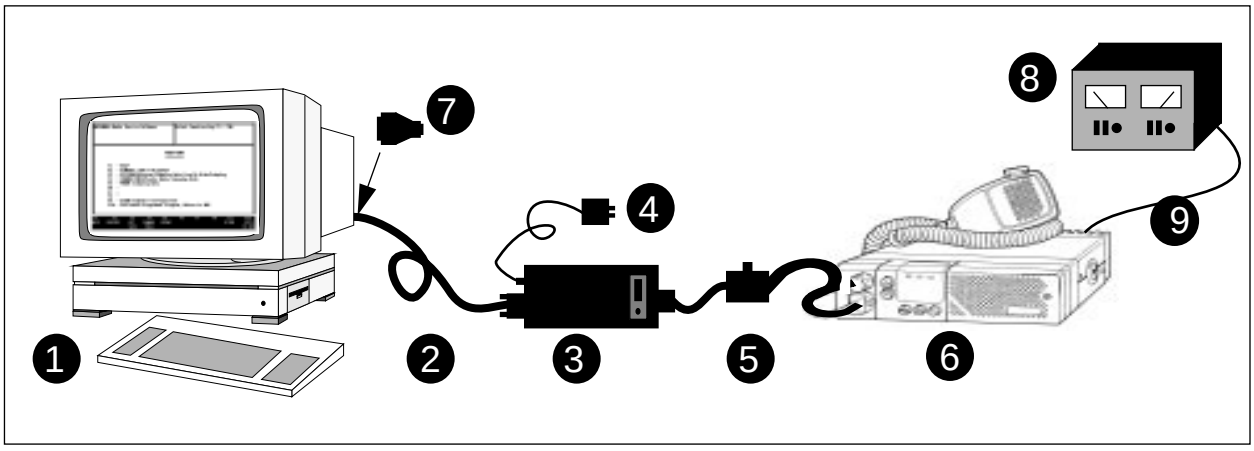
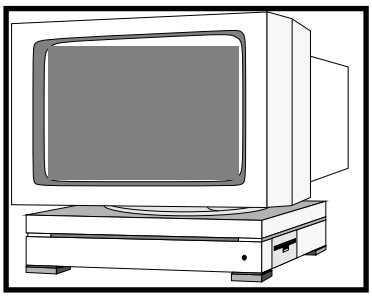


Figure 2-1. Equipment Setup

Note: Items 2, 3, 4, 5 and 7 are in the "first-time start-up package" (H5040), which is available from the Radius Distribution Center.

1. **Computer**.

   Recommend IBM-XT/AT or compatible, IBM convertible or IBM System/2 Model 30/50/70, with 640 K of RAM, and one diskette drive plus one hard disk drive. Computer should run DOS 5.0. or greater. See Hardware Platform - below.



2. **Cable**.

   Radius **HKN9216**. Radio Interface Box (RIB)-to-IBM-AT cable. Has a 9-pin end and a 15-pin end.

3. **RIB**.

   Radius **HLN9214**. Radio Interface Box.

4. **RIB Power Supply**.

   Radius **HSN9412**.

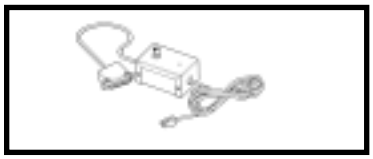
   (110 VAC) Using the power supply is more reliable than using a weak battery. A 220 VAC wall supply is available (01-80358A56).

   (For laptop computer and on-the-road use only, omit the RIB Power Supply and use 9V battery (not included)).

Warning: LED remains lit with a weak battery - this may cause certain errors on screen. Use a fresh 9V battery.

5. **Cable**.

   Radius **HKN9217**. RIB-to-Radio cable.

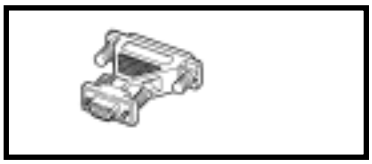


6. **Radio**.

   Radius GM300 Mobile Radio.

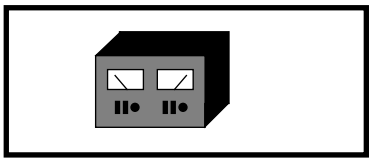
7. **Optional Adapter**.

   Radius **HLN9390** XT- to-AT-computer cable adapter.



8. **Radio Power Supply**.

   0 - 15 VDC, 15A. Set between 11 and 15 volts.



9. **Power Cable**.

   HKN4137AR, HKN9402A, HKN4137A.

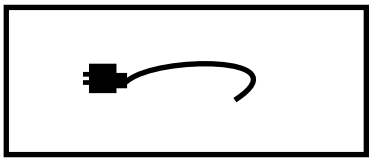


Table 2-1. Steps to Connect Hardware

1. **Connect 1 and 3 with 2.** First plug the 9-pin end of B into the communications port of A. Then connect the 15-pin end to C. *(If your computer has an XT-style communications port (25 pin connector), you will need the extra adapter 8 (HLN9390) to insert between 1 and 2.)*	3. **Plug 4 into an AC wall outlet**, and connect the other end to 3.
2. **Connect 6 and 3 with 5**. The 25-pin end of 5 goes into 3, and the "modular telephone" connector end plugs into the microphone jack on the front of 6.	4. Connect 6 to power supply 8 with 9.

After you connect the hardware, turn on the radio by turning the volume control clockwise. You will hear one of the following types of tones..

Table 2-2. Hardware tones

This tone...	Means this...
Higher-pitched, short tone	Hardware is connected correctly, and the radio's internal firmware is operating correctly.
High-pitched short tone followed by long (10 sec.) low-pitched tone	Hardware is incorrectly connected (check connections), radio is not receiving enough power (radio needs between 11 and 15 volts), or a checksum error is present in the radio's codeplug (call 1-800-356-1520 and report what you did and heard)
Continuous long, low tone	Critical failure - a radio's internal software malfunction.

You can install, start or explore RSS using just the diskettes and your computer if you don't have all the hardware. You can even update existing radio archive files stored on disk. What you cannot do without the hardware is read from or save to an actual radio.

When programming or calibrating a radio, DO NOT disconnect the radio from the RIB when the computer is communicating with the radio - it may leave the radio in an inoperable state. The only recommended time to disconnect the radio is at the MAIN MENU or GET/SAVE screens.

Note: If you are using a laptop computer (for example an IBM PC Convertible) and you plan to use the RSS while the computer is in battery mode, you may need to set the serial/parallel adapter to run on battery power. This can be done with the application diskette supplied by the computer manufacturer. If this is not done, you will receive serial bus errors.

Note: If your RIB has a switch and LED, be sure to turn on the switch before each programming session.

2.3 Hardware and Software Platform

2.3.1 Minimum Platform Requirements

We recommend the following minimum hardware/software platform:

- ❏ 80286 Microprocessor
- ❏ 640 K of RAM
- ❏ HDD (Hard Disk Drive) 30 Mb or higher
- ❏ DOS 5.0 or higher
- ❏ 3.5 inch FDD (Floppy Disk Drive)

2.3.2 Recommended Buy

We recommend that as your computer systems are upgraded, they should meet the following minimum standards:

- ❏ 80386 Microprocessor
- ❏ 4Mb of RAM
- ❏ HDD (Hard Disk Drive) 80 Mb or higher
- ❏ DOS 5.0 or higher
- ❏ 1.44 Mb 3.5 inch FDD (Floppy Disk Drive)
- ❏ Two (2) serial ports
- ❏ Mouse or trackball

Purchasing an 80386 computer with the minimum configuration as detailed above will ensure that your computer systems will not be quickly outdated.

2.4 Understanding Computer Basics

If you are already familiar with computers, skip this section and proceed to Section 2.7 on page 2-19 - *Starting RSS*.

Your computer can be compared to both a file cabinet and an electronics technician. A file cabinet provides easy handling, storage and retrieval of written data. So does a computer. The technician can, with tools, manually and physically alter the radio's features and functionality. So does a computer with RSS. A radio dealer can give a radio unique features, save those features for future reference, and service a radio internally, all without opening a drawer, thumbing through papers, picking up a tool or disassembling the radio.

Let's learn some of the types of computers that can be used for programming radios, the major parts of a computer, and the ways to store your desired radio personality data.

2.4.1 Which Computers Run RSS

RSS is designed to run on the following IBM computers and their compatibles and convertibles: IBM XT/AT, and IBM System/2 Model 30/50/70 computers. If you wish to use a laptop computer, we recommend the Everex Tempo Carrier laptop.

The following table lists computers with known compatibility problems:

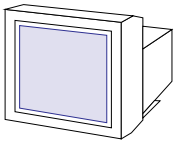
Table 2-3. Computers with Known Compatibility Problems

Computer Type	Problems	Recommendation
AT&T® 6300 Plus	This is an AT clone with an XT bus.	Not recommended.
Bondwell®	Compatibility problem.	Not recommended.
Compaq® III 386/20	RSS won't work when executed from a diskette drive - causes a failure on the serial port.	Execute from hard drive only.
Compaq LTE	Error #5 with COM test	Not recommended.
Compaq Model 1605	I/O port pinouts are not compatible.	Not recommended.
Epson® Equity 3	I/O port pinouts are not compatible.	Not recommended.
Epson Laptop Q150A	Power failure during COM test.	Not recommended.
Everex®1800D	RSS won't run for portables	External serial port solves problem.
IBM Model 50Z	Machine hardware problem	Replace mother board or add asynchronous COM card.
IBM Model 70	Machine hardware problem	Replace mother board or add asynchronous COM card.
Memorex®	Unknown	Not recommended.
Sperry® AT	Unknown	Not recommended.
Tandon® TN7000	Clock rate/speed problems	Not recommended.
Tandy®	Clock rate/speed problem.	4.7 MHz rate only works for mobile applications.
Toshiba® 1000	Unknown.	Not recommended.
Zenith® Supersport 286	Chip problem	Not recommended. Zenith dealers can fix. Newer versions may work.

2.4.2 Identifying Major Computer Parts

Computers range in complexity and size from small laptops to large mainframes. Falling between this range is the microcomputer. Most microcomputers consist of a monitor, a system unit, and a keyboard. These components are:

1. **Monitor**

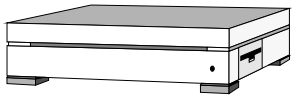
   

   Monitors perform like a window into the computer, allowing you to see the data inside the computer. Monitors come in a variety of sizes and colors. Some can be bigger than a 19-inch diagonal television, though a common size is 12 inches diagonally.

   Monochrome monitors have only one color behind the words and pictures on the display, which in many cases is either green, amber, white or black. Color monitors can display two or more colors on the display at a time, but with color monitors a slight decrease in picture sharpness or text legibility may be experienced. Colors on the RSS screen can be selected or changed by the user by using the RSS. To help users quickly find their place on the display before typing, a flashing underscore, called a "cursor" serves as a visual place indicator.

   Besides the display, a monitor has a power cord, an on/off switch, brightness and contrast dials, and a cable connection to the system unit. The RSS can function with either monochrome, CGA, EGA or VGA-based monitors.

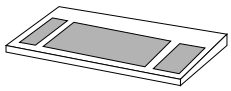
2. **System Unit**

   The system unit contains a special chip that is the "brain" of the computer, one or more diskette drives, a hard-disk drive (if so equipped), a cable connection to the keyboard, one or more communications ports and an on/off switch. System units use an 8088, 8086, 80286, 80386 or 80486 chip with speeds between 4.77 MHz and 50 MHz. The system unit should be treated with care, as jarring and hot temperatures could internally damage the unit.

Note: The RSS program may not function properly on computers with speeds greater than 20MHz.

3. **Keyboard**

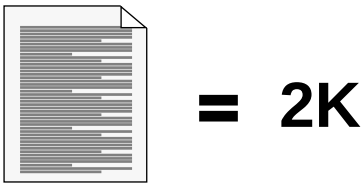
   

   A user instructs the computer what to do by typing commands on the keyboard. The monitor shows the commands as they are typed. Most keyboards have letter keys, numeric keys, and a number of special keys that perform special functions. Section 2.8.1 on page 2-26 - *Keyboards and Their Functions* describes some of these special keys and how they perform with RSS.

2.4.3 Understanding Computer Storage Systems

The computer can store large amounts of data (software programs, code, data, files) in several places. Some of these places are:

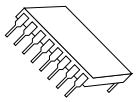
- ❏ Random-Access Memory (RAM)
- ❏ Read-Only Memory (ROM)
- ❏ Hard disk
- ❏ Diskettes.



The RAM, ROM, hard disks and diskettes all vary in function and all have certain size limits (memory). They all store data in terms of bytes; a byte equals approximately one character as typed on the keyboard. 1,024 bytes equals one kilobyte, or 1K. For comparison purposes, one page of double-spaced, typed text equals approximately 2K.

1. **RAM**

   The Random Access Memory (RAM) is a storage area in the system unit used to run programs and operating systems. The amount of RAM varies from computer to computer, and it directly affects which programs will run on your computer. With more RAM, you can run larger programs. Most programs indicate how much RAM is required to run RSS. We recommend at least 2 MB of RAM to run the RSS program. The Radius radios also have RAM embedded in them.

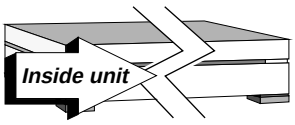


2. **ROM**

   The Read Only Memory (ROM) is a storage area in the system unit used by the computer for start-up and Power-On Self-Test (POST) purposes. The ROM is “read-only”, which means a user cannot write or save data to it, over it, delete it, or in any other way destroy it by using the keyboard keys. The program in the ROM is hard-coded into the ROM chip, and as such is protected from user errors. The Radius radios also have ROM embedded in them.

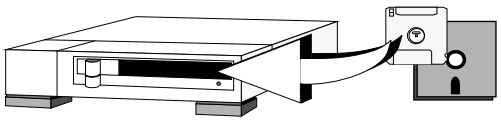
3. **Hard Disk and Hard-Disk Drive**

   A hard disk is a storage area inside the hard disk drive, both within the system unit. Hard disks store a user's programs and files (data). The hard disk drive accesses the hard disk data the same way a record player accesses the music (data) on a record, or a CD player accesses the music on a CD. Both the disk and the disk drive are needed to store (write or save) or retrieve (read) any data. The data stored on a hard disk can originate from data the you gener-



ate at the keyboard, or from data copied from a diskette. Hard disks can store from 20 megabytes (1 megabyte(MB) = 1 million characters) to over 100MB of data, depending on model type. Most hard-disk drives are labelled as the “C” drive.

4. **Diskettes and Diskette Drive**



Diskettes also store users' programs and files, but are different from hard disks because of their transportable, small size and packaging. A diskette must be “formatted” before storing your files and programs on it. After a diskette is inserted into a diskette drive, data on the magnetic diskette can be retrieved, stored, manipulated or erased. The operation of the diskette drive is also similar to the record-player concept described in the hard disk subsection.

Diskettes come in two sizes: 3.5 inch and 5.25 inch. Each diskette size has two memory capacities - low density and high density. The table below shows the memory capacity of both diskette size.

Table 2-4. Diskette Size and Capacity

Size	Low Density	High Density
3.5 inch	720K	1.44MB
5.25 inch	360K	1.2MB

The RSS program is distributed to you on one 3.5" low density diskette and two 5.25" low density diskettes so that it may be easily loaded onto any appropriate computer, regardless of the type of diskette drive that is available. Handle the diskettes carefully - avoid contact with the shiny, brown, magnetic disk surface under the protective plastic cover on the 5.25" diskette and the magnetic disk surface under the sliding metal plate on the 3.5" diskette. Such contact could damage the data and make it unreadable by the drive.

Diskette drives come in two sizes; one to accommodate the 5.25" diskettes and one to accommodate the 3.5" diskettes. With the 5.25" diskette drives, after inserting a diskette as far as it will go, you must close or push down the “drive door” located on the outside of the drive or else the computer will not read the data on the diskette. This drive door generally swings down and locks into place when firmly pressed, and it releases when gently pressed back the other direction when you want to remove your diskette. With the 3.5" diskette drives, the diskette is inserted into the slot until it locks into place. The drive does not have a door like the 5.25" drive. Instead it has an eject button, which when pressed firmly will release the diskette.

Most diskette drives are labelled “A” or “B”, with “A” generally being the first (or highest) one. The drives are sometimes labelled by the computer dealer before delivery to the customer.

Though it requires more steps, it is possible to run the RSS with only one diskette drive and no hard drive. Most businesses today have computers equipped with at least two drives, whether they are a hard drive and a diskette drive or two diskette drives. Instructions, steps, tables and procedures that apply to computers with only diskette drives (no hard disk drive) will be displayed in a shaded box.

To learn more about computer basics, read "The Personal Computer Book" by Peter McWilliams, Prelude Press, Los Angeles, CA. Call 1-800-LIFE-101 to order or secure further information.

2.4.4 Understanding the Disk Operating System (DOS)

A computer user operates, communicates with and commands the computer using the computer's Disk Operating System (DOS). DOS commands have special meanings to the computer.

Before you can use DOS commands, they must be either installed on your hard disk, or loaded into the computer's RAM via your diskette drive. The table below lists the procedure to "Load DOS" if your computer does not have a hard disk. This table assumes your computer has a diskette drive labelled A.

Table 2-5. Loading DOS From a Diskette

Instruction	How to Do It/What it Means
1. Insert DOS diskette into drive A	Put DOS diskette into the slot on the diskette drive and insert it as far as it will go. Close the drive door
2. Power up the computer	Power up the monitor, then the system unit. The computer will read the data on the diskette and load DOS into the computer's temporary storage - RAM. The computer's prompt will be: **A**
3. Remove DOS diskette	Open the drive door and remove the DOS diskette.

DOS version 3.2 or later is required to run RSS. However, we highly recommend later versions, the later the better, such as DOS 5.0.

Note: An intermittent serial bus error may occur when using DOS 4.01 - if after checking the communications between the computer and the radio you receive the same error, try a different DOS version.

DOS commands can be either upper case or lower case letters, it doesn't matter, but we show all DOS command in upper case letters.

The table below lists some of the DOS commands that you may use now or in the future for RSS work. Words in italics mean you should substitute that word for the word that is appropriate for your specific situation (such as your file's name or your directory name). After each command, press the Return (or Enter) key.

Table 2-6. Common DOS Commands

DOS Command	What it Means
A:	Go to drive "A".
B:	Go to drive "B".
C:	Go to drive "C"
CD\	Return to the root directory. **CHDIR** also works.
CD *DIRNAME*	Change directory to the directory named DIRNAME, maximum directory length is 8 characters. CD used alone will display the current working path name.
COPY B:*.* A:	Makes an identical copy of all files from root directory of diskette in "B" drive to root directory of diskette in "A" drive. The *.* means all files within the directory specified. You can also copy files in the same directory giving the file a different name as the second argument to the copy command, and you can combine several files into one file or append files. In all cases, the first argument is the source file (the one to copy from) and the last argument is the target file (the one to copy to).
DEL *.*	Delete all files in current directory. WARNING: files cannot be recovered after executing this command without backups located in a different directory!
DIR	Lists the files in the current working directory. You can list files in other directories too by specifying a pathname following the command. If you have more files than will fit on the display, you can type DIR /P, which will make DOS pause when the display is full. Pressing any key resumes the listing. DIR /W specifies a wide display (5 columns) of file names.
DISKCOPY B: A:	Copies the contents of the disk in drive B to the disk in drive A. Drives must be of the same size and density. If your drives are not the same size and density, use the same drive name twice, such as DISKCOPY A: A:.
FORMAT A:	Format an unused, new or old diskette in drive "A" of the computer so it will accept DOS files.
MD DIRNAME	Make a new sub-directory called DIRNAME of 8 characters or less. (You substitute your own directory name for the italicized word DIRNAME.) MKDIR also works.
PROMPT PG	Change the display's prompt to include the current working directory's drive and path name, followed by the ">" sign.
PATH	Set a command search path (such as PATH=C:\MRSS\GM300\ARCHIVE). This tells the computer to search this directory after the working directory when a command is entered.
RD *DIRNAME*	Remove a sub-directory called DIRNAME. Removal of the sub-directory requires that it be empty. Files can be deleted by the DOS DEL command. RMDIR also works.
VER	Prints the DOS version installed on the computer, such as "DOS Version 5.0".
XCOPY	Copies files and directories, including all sub-directories. This command uses disk space more efficiently and can speed up file access time.

For further information on these and other commands, consult your DOS User's Manual.

You may have noticed some special characters in the preceding table (*, $, .). Certain keyboard characters mean special things to DOS. Some of these are:

Table 2-7. DOS Special Characters

DOS Special Character	What It Means
*	Wildcard character. You can substitute this character for any type or quantities of characters/digits that follow (not precede) it
\	Backslash. A special character to separate directories when specifying path names. By itself, it also represents the root directory
?	Wildcard character meaning you can substitute/match it for any single-digit or character
PG	Sets the display's default prompt to be the current drive and path name, followed by the ">" character
.	Period (or "dot"). This character, though not visible when a **DIR** command is executed, separates DOS file names from their extensions. Remember this when copying or deleting files.

There are a couple limitations you may want to know about DOS, RSS files and directories.

- ❏ DOS only allows file names to be 8 characters long. However, file names can have an optional 1, 2 or 3-character extension after the file name. The extension must be separated from the file name by a period (sometimes called a "dot").
- ❏ DOS allows only 111 files under the root directory (topmost) on any diskette or hard disk. We highly recommend that you further subdivide your files into more directories before you accumulate this many files in any directory, not just the root directory. It's very confusing and time-consuming to work with or view this many files at once.
- ❏ The maximum number of files allowed by RSS in any non-root directory, whether diskette or hard disk, is approximately 400. This is an RSS limitation, not a DOS or computer limitation. If you have more than 400 files, create another directory.

2.4.5 Using RSS with Window Applications

The RSS is not a Microsoft Windows program. The RSS program can be executed only from the DOS prompt on computers which are running Microsoft Windows.

2.5 RSS Diskettes Contents

Table 2-8 and Table 2-9 on page 2-14 list the files located in the diskettes you received with this manual.

Table 2-8. RSS Diskette Contents - ROOT DIRECTORY

File Name	File Type	Description
HDINSTAL.EXE	installation	Installs RSS on the hard disk. To install RSS on your hard disk from 3.5" diskettes, type: **HDINSTAL C: 3.5** To install RSS on your hard disk from 5.25" diskettes, type: **HDINSTAL C: 5.25** HDINSTAL accepts three parameters, the first is the targeted installation drive letter, the second is an optional installation pathname, and the third is the disk size of 3.5 or 5.25 (5.25 is the default)
GM300.EXE	executable file	Runs the RSS. If using 5.25” diskettes, insert diskette #1. To start the RSS, type: **GM300**
GM300_1.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_2.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_3.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_4.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_5.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_6.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_7.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_8.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_9.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_10.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_11.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300_12.OVL	executable overlay file	Part of the RSS after the .EXE file starts
GM300.CFG	diskette configuration data	Default computer configuration data for running the RSS off the diskette
GM300.MDF	definition file	Data file used by RSS
GM300._HD	hard disk configuration data	Default computer configuration data for the hard disk. The installation must be executed to have this file correctly initialized
GM300.HLP	help	Contains on-line help for the RSS, accessed via the RSS

Table 2-9. RSS Diskette Contents - ON DEMO Diskette (Not Copied by HDINSTAL command)

File Name	File Type	Description
DEMO1.BAT	demo/tutorial file	Starts up the on-line demonstration of how to program a radio. The demo will start when you type: **DEMO1**
DEMOTRAY.001	demo slide tray file	Lists the order of the picture slides
PRESENTS.COM	presentation software	Public domain software that presents the demo outlined in the demo slide tray file
PIC	picture slides	These are the demo slides used in the presentation
A*9999999.999*	archive file	An image of a radio's personality (codeplug). Archive files always start with an "A". The rest of the file name (italic 9's) is the radio's serial number. It is created
GM300.DBF	archive database header file	Created by RSS the first time an archive directory path is specified. Helps RSS locate/retrieve archive files

A "file" can be a program (a set of commands to tell the computer what to do), or a collection of data or information. As mentioned in the DOS section, DOS files generally have two parts - a file name followed by an optional file extension. The extension provides an easy way to, at a glance, identify or tag files for easy grouping or categorizing. In the computer world, some file extension naming conventions have evolved, and Radius uses these conventions in RSS.

The "A" in the file name "A9999999.999" in Table 2-9 indicates that the file being saved is a radio "Archive" file. The "9999999.999" refers to the radio's 10-digit serial number. As DOS file names are limited to 8 characters in the prefix and 3 characters in the extension, this RSS default radio archive file naming system conforms correctly. For example, the sample file name "A1234567.890" could be a valid radio archive file name.

The RSS also creates files. These files are:

- ❏ GM300.DBF - An archive data base header file created on the hard disk after RSS is started, and also created on the diskette if you save archive files to a diskette. It allows the RSS to locate and retrieve archive files.
- ❏ GM300.BAT - A file generated by the hardware installation command (HDINSTAL) and located under the root directory of the hard drive, enabling RSS to startup from the root directory.
- ❏ Archive files - Computer files of the radio personalities stored on the hard disk or a diskette.
- ❏ Backup files - Extra copies of the archive files stored on a different diskette and/or drive than the original archive files.

Next you'll learn how to organize your own disk and diskettes that you'll use to store your radio archive files. We suggest that frequent RSS users and computer pros skip Organizing Your Disk and Diskettes and go directly to Starting RSS. New users should read all sections.

2.6 Organizing Your Disk and Diskettes

When you first start using computers you typically do not have many files to organize. But after a while it gets increasingly difficult to distinguish between file types, to pick out a specific file in a long list, to keep track of what's in which file, or to remember which files are similar in content. Therefore, it's important to spend some time now deciding which types or groups of files should be located together in a common place, called a directory.

You can make directories using the DOS MD or MKDIR commands (or inside RSS via the FILE MAINTENANCE MENU).

You may want to organize your directories first by customer area, then by customer name, and finally by radio model type, or perhaps in the reverse order. Consider the different ways in which you operate your business - do you separate radio files by customer location, by sales revenue, by fiscal year, or perhaps by date of purchase? When deciding how to organize your files and directories, we offer a few suggestions.

- Put as few directories as possible near the top, or root, of your directory tree, considering your future growth too. (For example, if you have 100 customers within 4 geographical areas, we suggest your first level of "sub" directories be the areas that encompass the customer. The next level of directories would be the customer names within each of those areas.) The idea is to make the root system spread out wider the deeper you grow, similar to a pyramid shape.
- Keep the RSS diskette contents in one directory and your archive files in a different directory.
- Keep archive files in separate directories according to radio model type (GM300, GP300, etc.). It is not possible to know a file's model type by looking at the file name. Have a separate directory name for each radio model, then store the archive files for that specific model within the appropriate model directory. This way archive files for multiple model types are not located in the same directory.
- Dedicate and create a separate diskette for your backup files, and always make backup copies of your files. If you routinely store archive files on your hard disk, make backup copies of your files on a diskette. This is very easy to do using the RSS, and is explained in Table 2-12 on page 2-20. If you don't have a hard disk, you can use the DOS diskcopy command to make a backup copy of your archive files. This command is discussed in Table 2-5 on page 2-10

2.6.1 Organizing Your Hard Disk

Figure 2-2 is a sample directory tree for storing your radio archive files on your computer's hard disk. Though your hard disk directory tree may be a little different based upon your way of doing business, this setup may be a starting point for you. To create this directory tree on your hard disk, follow the steps below. After each command, press the Return (or Enter) key.

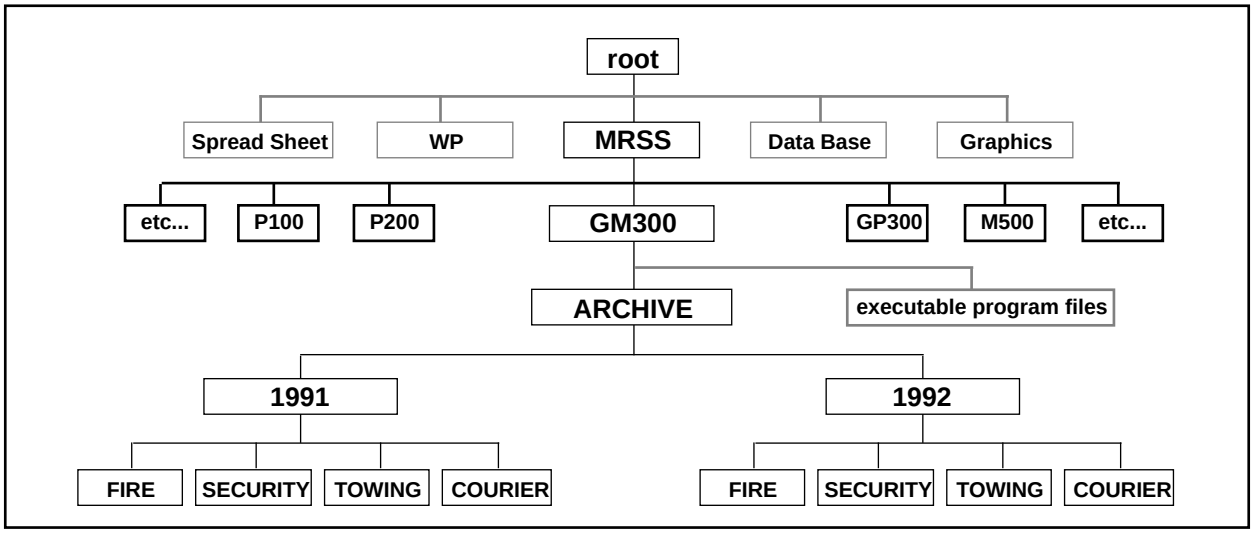


Figure 2-2. Hard Disk Directory Tree

Table 2-10. Steps to Create Hard Disk Directory Tree

Instruction	What To Type	Explanation
1. Go to drive C	C:	Go to Drive C
2. Go to root directory	CD\	Move (change directory) to the root directory
3. Make MRSS directory	MD MRSS	Make a directory under root called "MRSS". You may have several other directories under root, such as spread sheet or word processing applications
4. Go to MRSS directory	CD MRSS	Change directory to the MRSS directory
5. Make GM300 directory	MD GM300	Make a directory under MRSS called "GM300"
6. Go to GM300 directory	CD GM300	Change directory to the GM300 directory
7. Make ARCHIVE directory	CD ARCHIVE	Change directory to the ARCHIVE directory
8. Make 1992 directory	MD 1992	Make a directory under here (at C:\MRSS\ GM300\ARCHIVE) called "1992".
9. Make FIRE directory	MD 1992\FIRE	Make a directory under 1992 called "FIRE"
10. Make SECURITY directory	MD 1992\SECURITY	Make a directory under 1992 called "SECURITY
11. Make TOWING directory	MD 1992\TOWING	Make a directory under 1992 called "TOWING"
12. Make COURIER directory	MD 1992\COURIER	Make a directory under 1992 called "COURIER"
13. Make 1991 directory	MD 1991	OPTIONAL - Repeat steps 7-11 for the 1991, FIRE, SECURITY, TOWING and COURIER directories (for the year 1991) if you want to arrange past files in this way.

2.6.2 Organizing Your Archive File Diskettes

Figure 2-3 below shows a sample directory tree for storing your radio archive files on a diskette.

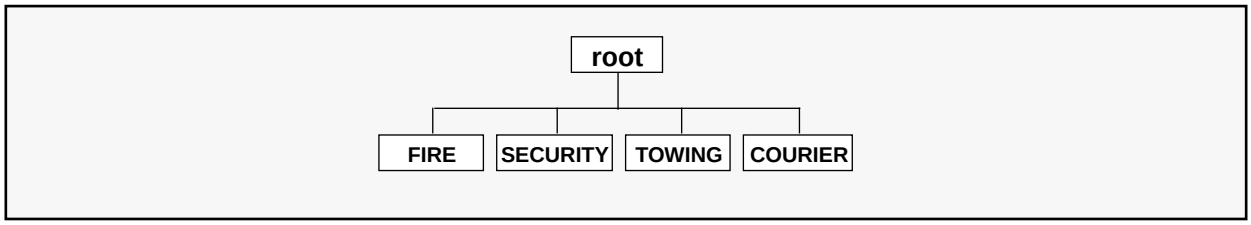


Figure 2-3. Diskette Directory Tree

Organizing a diskette is easier simply due to the limited space on a diskette. Though your tree may be different based upon your way of doing business, this set-up may be a starting point for you. Be sure to label the outside of your diskettes accurately, such as "1992 GM300 Archive Files." Depending on the size of your business, you may even have a separate diskette for FIRE, one for SECURITY, etc.

To create the directory tree shown in Figure 2-3 on your diskette, follow the steps listed in Table 2-11 on page 2-19. After each command, press Tab (or Return or Enter). This exercise assumes you are using drive A and the diskette contains only GM300 archive files (not RSS files and not backup files).

Table 2-11. Steps to Create Diskette Directory Tree

Instruction	What to Type	Explanation
1. Create diskette label		Label formatted diskette to correspond to the contents of the diskette such as “GM300 Archive Files”. Don’t apply it to the diskette yet.
2. If no hard disk, load DOS		See Table 2-5 on page 2-10 to load DOS using drive A. Remove DOS diskettes after loading. If not at the root directory of drive A, type: CD
3. Put new diskette in A		Insert a new diskette into drive A. Close the drive door.
4. Format diskette	FORMAT A:	Format the new diskette in drive A. Discard diskette if errors occur and try another.
5. Label diskette		Remove formatted diskette; apply label without covering the exposed magnetic areas.
6. Insert diskette again		Insert diskette into drive A again. Close door.
7. Start at root	CD\	Move (change directory) to the root (uppermost) directory of the diskette.Omit if already at root level.
8. Make FIRE directory	MD FIRE	Make a directory under root called “FIRE”.
9. Make SECURITY directory	MD FIRE	Make a directory under root called “SECURITY”.
10. Make TOWING directory	MD TOWING	Make a directory under root called “TOWING”.
11. Make COURIER directory	MD COURIER	Make a directory under root called “COURIER”.
12. Create other directories		Make more directories for each additional category you may need.

2.7 Starting RSS

You are now ready to start RSS on your computer. This subsection, which takes about 30 minutes, explains when to install, reinstall or discard the RSS diskettes, then guides you through installing RSS on a hard disk, and finally lists how to start RSS with the appropriate executable command.

If your computer has a hard disk, we recommend running RSS from the hard disk whenever possible, as the response time with it is faster and the files are less susceptible to external damage.

2.7.1 Making Backup Copies of RSS Diskettes

As with any program, it's important to make a backup copy of the RSS diskette before you begin to use it. Whenever you receive a new version of RSS, you should make a backup copy.

If your computer has both 3.5" and 5.25" diskette drives, use one size diskette you received from us as your working copy and the other size for your backup copy. Both sizes we deliver contain the exact same files. If one becomes damaged, immediately make a working copy from the backup one.

If your computer has only one size diskette drive, the other size diskette(s) will be useless to you. For example, if you have only a 5.25" diskette drive, the 3.5" diskette will not work in your drive. In this case, make a backup copy of the 5.25" diskettes.

We recommend making a backup copy of the RSS diskette whose size matches your computer's diskette drive, even if you have a hard disk. To make a backup copy, follow the steps in Table 2-11 on page 2-19. These steps assume you have one diskette drive named A or you have two diskette drives that are not the same size and density, and that DOS is loaded. (DISKCOPY will not copy from one drive to another if the drives are not the exact same size and density.)

Table 2-12. Steps to Backup the RSS Diskettes

Instruction	What to Type	Explanation
1. Insert RSS diskette		Put supplied RSS diskette into drive A; close the door.
2. Make the backup copy	DISKCOPY A: A:	This copies the data on the source diskette in drive A (supplied RSS diskette) to the target diskette (the newly-formatted diskette). Careful - accidentally reversing the insertion order of the diskettes will erase the contents of the RSS diskette. DOS will tell you when to insert the *source* diskette (RSS one) and when to insert the *target* diskette (the newly-formatted one). When the diskcopy is complete, use the target diskette as the new working copy. (If you have 5.25" diskette drives, do another diskcopy for the second diskette).
3. Keep originals safe		Store the original RSS diskettes in a safe place - away from magnets, moisture, heat and where they won't be bent.

2.7.2 What to Do with Previous Versions of RSS Diskettes

After you make a backup copy of the new RSS diskettes, you may wonder what to do with the old, previous RSS versions you may have accumulated. We recommend discarding them so you always have the most current version available and you won't mistakenly program a radio with outdated data.

2.7.3 Starting RSS From Hard Disk

To run RSS from the hard disk, it must first be installed there. A hard-disk drive installation program is in the RSS diskettes. After installing RSS on your hard disk, follow the startup procedure.

2.7.3.1 *Installing RSS on Hard Disk*

Install the latest RSS version as soon as you receive it - using the install program with the diskettes you received with this manual insures you have the latest and greatest version of the RSS. It also keeps important files in a consistent place for cross-referencing and future use. The software installation takes approximately three minutes.

The install program will:

- ❏ Create the MRSS, GM300 and ARCHIVE directories, if they are not already there.
- ❏ Write over the old version's program files with the same name, if present.
- ❏ Create certain files on the hard disk to make using the RSS easier (“.CFG”, “.DBF”, “.MDF”).

The install program will *not*:

- ❏ Write over your archive files.
- ❏ Write over your backup files.

Before doing the installation steps that follow, be sure you have made a backup copy of the RSS.

The steps shown in Table 2-13 install RSS on a computer equipped with a hard-disk drive and two diskette drives. After each "What to type" step below, press Return or Enter.

Table 2-13. RSS Hard Disk Installation Procedure

Instruction	What to Type	Explanation
1. Put RSS diskette in drive **A**		Insert the RSS diskette into drive A (close the door). If you must use the 5.25" RSS diskettes, insert RSS diskette # 1 first. Later you will be instructed to insert the other one
2. Go to drive **A**	A:	This tells the computer to work from drive A.
3. Start the installation.	If installing from 3.5" diskettes type: **HDINSTAL C: 3.5** If installing from 5.25" diskettes type: **HDINSTAL C: 5.25**	This transfers the RSS program to your hard disk. Follow directions and answer questions on the display when they appear. When the DOS prompt returns, you may start the RSS program.
4. Store diskettes in safe place.		Keep the RSS diskettes in a safe place and start RSS from the hard disk from now on.

Note: The RSS program takes up less than 1MB of storage on your hard disk.

After installing RSS on a hard disk, you may notice a .BAT, extension, a .CFG extension, a .DBF extension and a .MDF extension on some files. These types of files are explained briefly below. Do not delete or move these files from the C:\MRSS\GM300 directory.

- **".BAT"** A batch file. The HDINSTAL command file creates a file called GM300.BAT in the top level directory of the hard drive.
- **".CFG** "Created and modified by the RSS, the configuration file (".CFG") contains the PC port choice, default pathnames and the display-type data.
- **".DBF"** Created by the RSS the first time an archive file directory path is specified. This archive database header file allows the RSS to locate and retrieve archive files, based on serial numbers. **DO NOT OVERWRITE OR DELETE THIS FILE. If you do, contact Radius Product Services.**
- **".MDF"** The model definition file defines which radio models the RSS can program.

2.7.3.2 *Installing on Multiple Computers or Networks*

You may install RSS on several personal computers and laptop computers at a single site, according to your license. If you have additional sites, you should purchase additional subscriptions.

2.7.3.3 *Hard Disk RSS Startup Procedure*

To start RSS from your hard disk, follow the steps in the table below. After each "What to type" step, press Tab (or Return or Enter).

Table 2-14. Hard Disk Startup Procedure

Instruction	What to Type	How To Do It What It Does
1. Move to C drive	C:	Work from hard disk, the C drive. If you have a hard disk and you bring up your computer with no diskettes in the diskette drives, you will already be at the C drive.
2. Start the RSS program	GM300	This command starts the RSS program. If it does not start correctly, you may hear a tone or see an error message or error code printed on the display (see Appendix A and B). (This command makes the MRSS, GM300 and ARCHIVE directories if not already present.) If the RSS program does not start, verify that the file GM300.BAT appears under the root directory of the C drive

After you start RSS from the hard disk, you will see the BANNER screen. Hard disk users can proceed to Banner Screen.

2.7.4 Starting RSS From Diskettes

Start RSS from diskettes only when there is no hard disk available. The following sections list the steps to start the RSS for each size of diskettes. If you have both a 3.5" diskette drive and a 5.25" diskette drive, we recommend using the 3.5" diskette and drive.

2.7.4.1 *Startup Procedure Using 3.5" Diskette*

The RSS startup procedure in Table 2-15 assumes the 3.5" diskette drive is labelled drive A.

Table 2-15. 3.5" Diskette Startup Procedure

Instruction	What to Type	How to do it/ What to Type
1. Insert diskette		Insert the 3.5" diskette into drive A
2. Move to drive A	A:	Direct computer to work from your 3.5" diskette drive
3. Start the RSS program	GM300	This command starts the RSS program. If it does not start correctly, you may hear a tone or see an error message or error code printed on the display (see Appendix A)

When you start RSS for the first time from a 3.5" diskette, you will see the following:

- ❏ SERVICE SOFTWARE CONFIGURATION MENU. (Press the F10 key to exit it for now, we'll return to it later.) This menu will not appear subsequent times.
- ❏ BANNER screen.
- ❏ MAIN MENU.

2.7.4.2 *Startup Procedure Using 5.25" Diskettes*

The RSS startup procedure in the table below assumes the 5.25" diskette drive is labelled “A.”

When you start RSS from a 5.25" diskette, you will see the screens below in the following order:

- ❏ SERVICE SOFTWARE CONFIGURATION MENU.
- ❏ BANNER screen.
- ❏ MAIN MENU.

To prevent the SERVICE SOFTWARE CONFIGURATION MENU from appearing every time you start RSS, see the specific instructions for 5.25" diskette use in “Setting Default Archive and Backup Paths” on page 2-36.

2.7.4.3 *Service Software Configuration Menu*

If you are using diskettes to run RSS for the first time, you will see the SERVICE SOFTWARE CONFIGURATION MENU (see below):

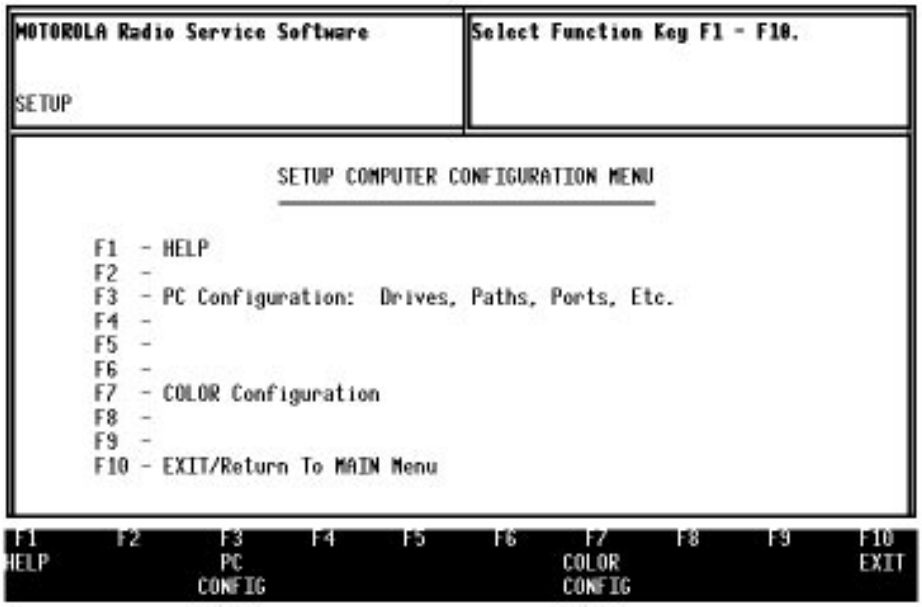


Figure 2-4. Service Software Configuration Menu

For now, press the F10 key on your keyboard to exit this menu. We will return to it later.

2.7.4.4 *Banner Screen*

When the program correctly loads, you will see a "BANNER" screen (see below) with the Motorola logo and copyright information.

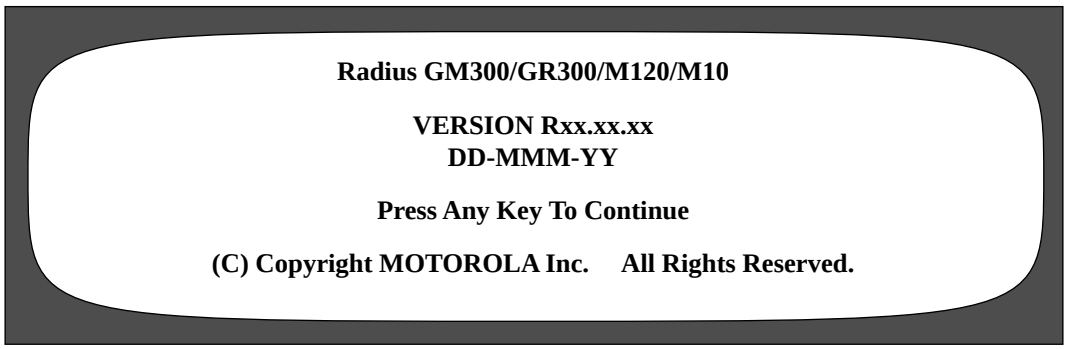


Figure 2-5. Banner Screen

Press any key. You will now see the MAIN MENU.

2.7.4.5 *Main Menu*

After pressing any key at the BANNER screen, the MAIN MENU (see below) appears.

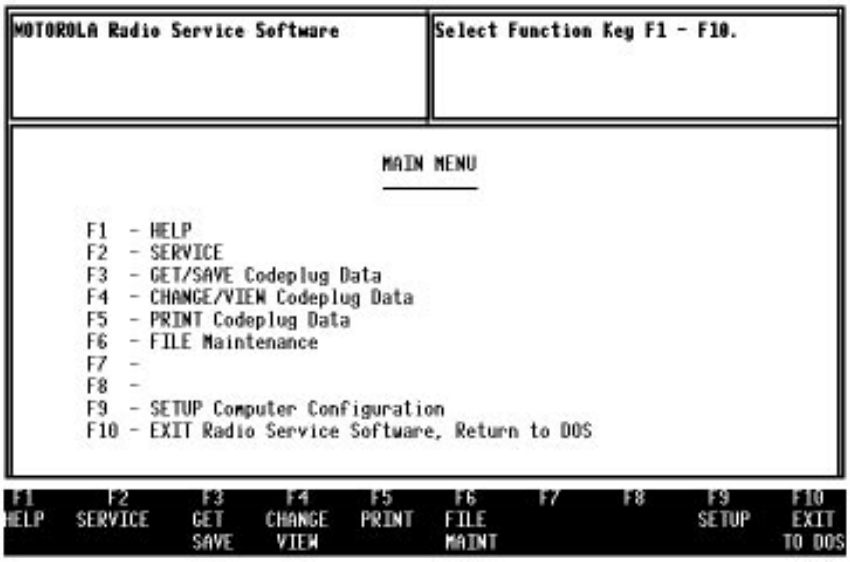


Figure 2-6. The Main Menu

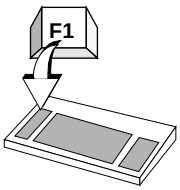
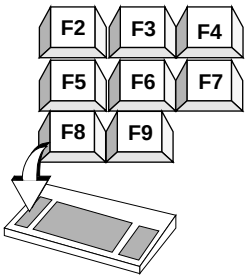
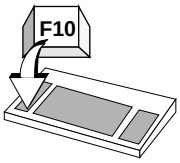
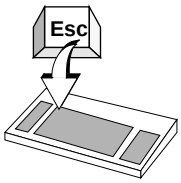
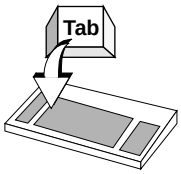
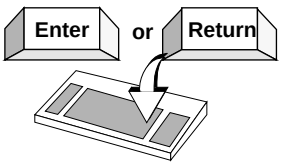
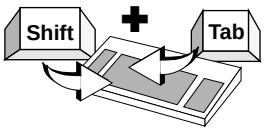
From here you can begin to program a radio, but first we will explain how to move around within the menus and screens of the RSS with the keyboard keys. The parts of a menu are described in Section 2.8.2 - *Anatomy of a Menu*.

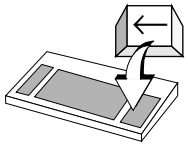
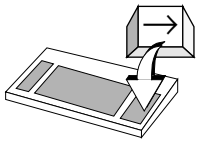
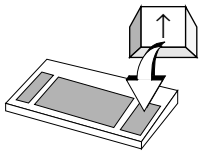
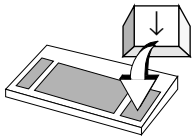
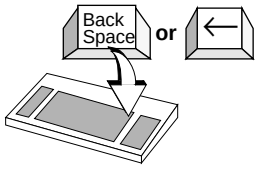
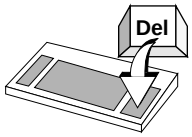
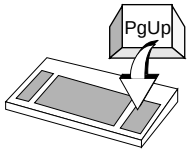
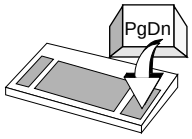
2.8 Navigating Through RSS Menus

You have successfully started RSS and are ready to learn just what it is you see on the display, how to move around, how RSS is organized, how to change the feature choices, and finally, how to exit.

2.8.1 Keyboards Keys and Their Functions

Now that the RSS Main Menu is on your display, to proceed any further you may want to know about the keyboard keys and what they do. Every action of RSS is controlled by you through the use of formatted displays and function keys. The function keys are the ten keys labelled F1 to F10 grouped on the left hand side of the keyboard on some keyboards or the twelve keys labelled F1 to F12 at the top of other keyboards.

	**F1** - Displays help information on every screen and menu. This online help provides information on how to use the currently displayed menu, screen, line or field. You may also find system setup information. In many cases the help is provided for the specific line of the screen that is currently highlighted.
	**F2 - F9** - Perform special functions. The **F2** through **F9** keys perform specific functions and actions which can vary from menu to menu and screen to screen. *On some screens*, **F5** will print the current screen to your printer, and **F8** will save the data and options currently displayed.
	**F10** - Exit to previous menu or screen. The **F10** key moves the display backward in the RSS tree, one screen or menu at a time. **F10** performs this function on every menu and screen.
	**Esc** - Exit to **MAIN MENU**. **Esc** performs this function on every menu and screen.
	**Tab** - Accepts data currently in field then moves prompt forward one field. If a field's entry is not accepted, an "error beep" will sound. Performs exactly like **Enter** or **Return** key.
	**Enter** or **Return** - Accepts data currently in field then moves prompt forward one field. If entry is not accepted, an "error beep" will sound. This key is usually two to four times as big as the letter keys on the keyboard. Performs exactly like **Tab** key.
	**Back Tab (Shift + Tab)** - Accepts data currently in field then moves the prompt backward one field at a time. To backtab, press and hold a **Shift** key and then press the **Tab** key.

	**Left Arrow** moves cursor left one character. The **Backspace** key will also move the cursor backwards (left) one space at a time. **Num Lock** (a keyboard key) must be turned off.
	**Right Arrow** moves cursor right one space. **Num Lock** (a keyboard key) must be turned off.
	**Up Arrow** - Scrolls through selections, or increases the current relative value. **Num Lock** (a keyboard key) must be turned off.
	**Down Arrow** - Scrolls through selections, or decreases the current relative value. **Num Lock** (a keyboard key) must be turned off.
	**Back Space** - Erases the current character in the field *and* moves cursor one space backward (left). The back space key on some keyboards is a left arrow. **Num Lock** (a keyboard key) must be turned off.
	**Del** - Erases current character in field.
	**PgUp** - Displays the previous page of information on the screen. This is on the numeric keypad, generally found on the right side of the keyboard. **NUM LOCK** (a keyboard key) must be turned off.
	**PgDn** - Displays the next page of information on the screen. This is on the numeric keypad, generally found on the right side of a keyboard. **NUM LOCK** (a keyboard key) must be turned off.

2.8.2 Anatomy of a Menu

Within RSS, there are menus that take you to screens where you can change the choice or value of a field. The only difference between a menu and a screen is the information shown in the working area, shown as 3 in Figure 2-7. A menu or screen has four areas, labelled below as 1, 2, 3, and 4.

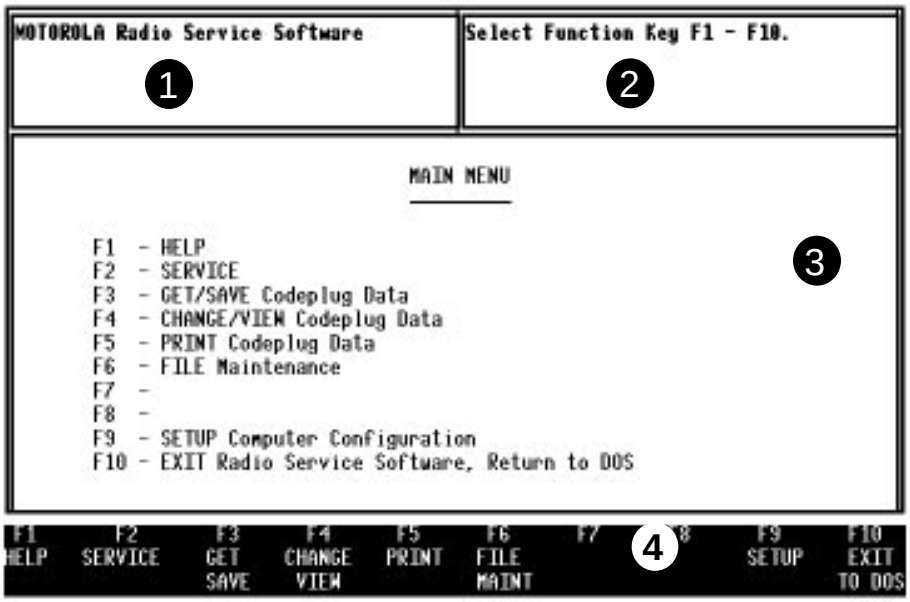


Figure 2-7. An RSS Menu

1. Location ID Area. In this area you will find the words "Motorola Radio Service Software" and a menu or screen pathname for the current menu or screen shown on the display. Each menu and screen name will be separated by a colon (:). For some examples of this pathname, glance ahead in this manual to see the menus and screens that are deeper into the RSS tree (past this MAIN MENU (the highest root level), which is the assumed, default starting point). If a radio is connected, the current radio model being read will also be displayed in this area.

2. Instruction Area. This area tells you the allowable actions for the current menu or screen. It is divided into 4 lines; the first two lines are reserved for messages to the user, and the last two lines are status lines.

3. Working Area. This area of a menu (not a screen) displays a list of functions (menu choices) you can execute from the current menu. Each menu-item is preceded by an F-number key. Pressing an F-number key advances you to another menu or screen (see Figure 2-9).

4. F-Key ID Area. This area displays the F-number keys and function names for the current menu or screen.

2.8.3 Anatomy of a Screen

As stated before, the only difference between a menu and a screen is the contents of the working area, shown as 3 in Figure 2-7, and shown in Figure 2-8 as the "Working area". Screens list features (fields) that can be viewed or edited.

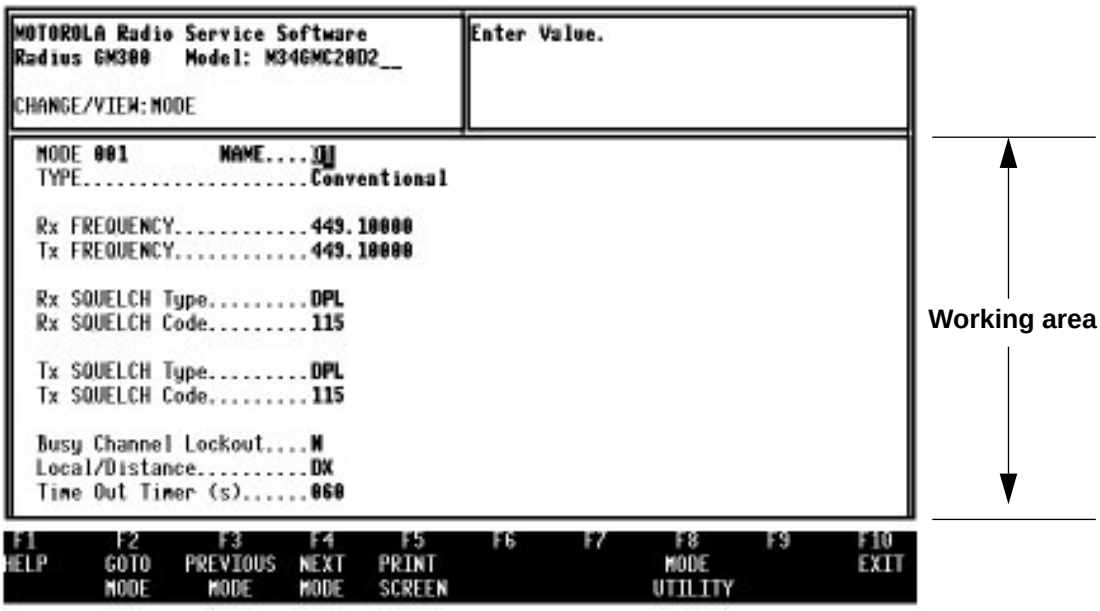


Figure 2-8. An RSS Screen

The working area of a screen contains a list of programmable features called "fields" that can be selected or changed using the arrow, tab or return keys described earlier. On some screens are features that can be selected for each individual channel (hereafter we will refer to a channel as a "mode"); these features are selected on a "per-mode" basis. On other screens are features that can be selected for all modes of the radio ("radio-wide" features). And still other screens list those features that perform a certain RSS function, such as servicing the radio or printing the personality data. Fields are further described in Section 2.9 on page 2-33.

2.8.4 Complete Menu Mapping at a Glance

The screens are organized in a tree-root fashion as shown in Figure 2-9 on page 2-31. Though this tree-root system is shown sideways in the following picture, it shows how the whole system starts with a main root (MAIN MENU) at the left side and branches outward from the main root. This branching grows deeper as you get closer to the precise screen which contains the feature you want to program into the radio.

Traveling from one RSS menu or screen to another is similar to the way a car must use the road system to drive to the other side of a lake, instead of flying directly as a plane would. To move forward from one screen to another, use one of the F-keys until you've reached the menu that contains the other screen you want. To back up, use the F10 key. Each time you press F10 you retreat to the previous screen or menu, moving closer to the MAIN MENU. For example, to move from A to B in Figure 2-9 on page 2-31, from the READ CODEPLUG screen you would press F10 to retreat to the GET/SAVE MENU, then F10 to retreat to the MAIN MENU, then press F4 to advance to the CHANGE/VIEW MENU (Figure 2-10), then finally press F5 to proceed to the MODE CONFIGURATION screen.

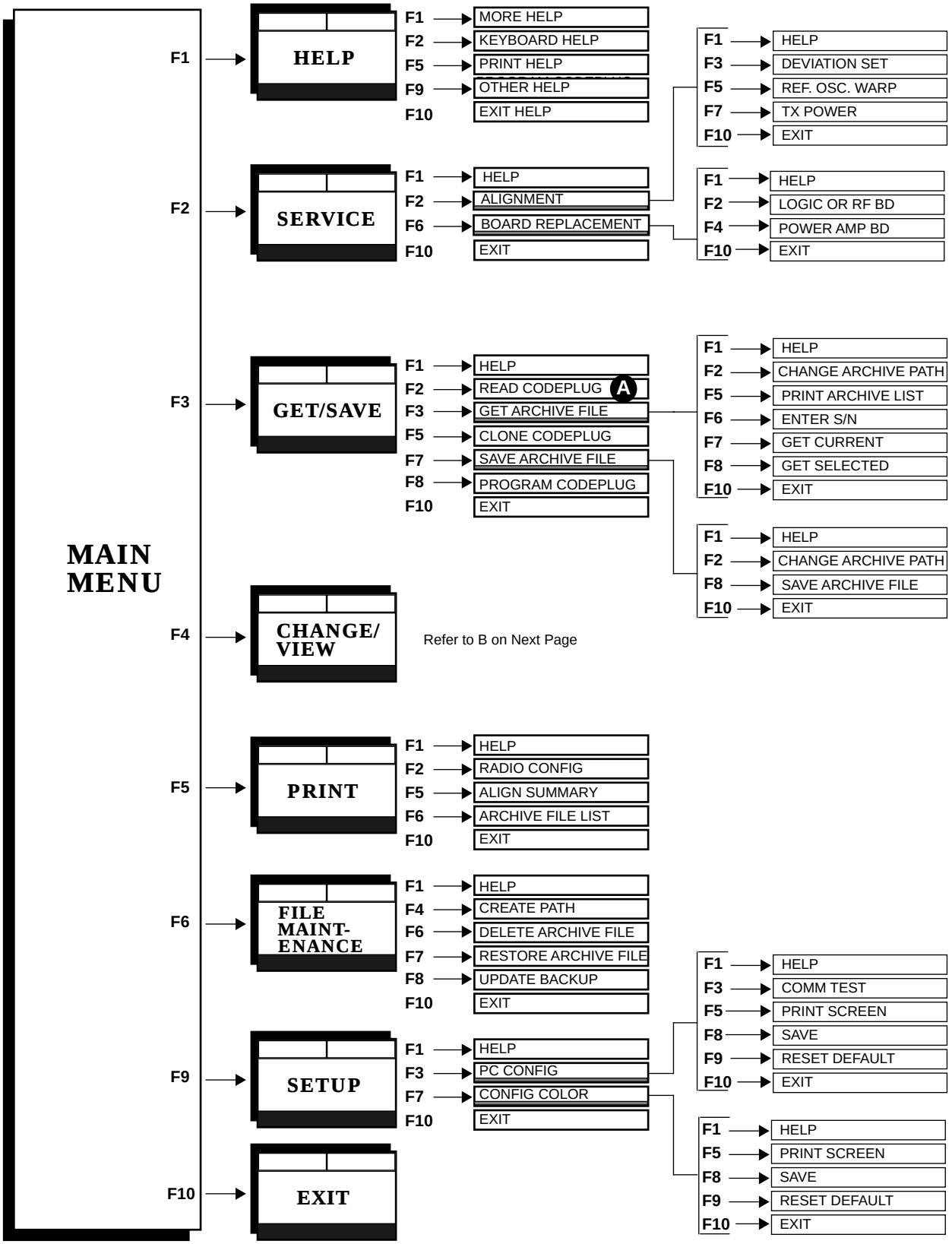


Figure 2-9. RSS Menu Mapping at a Glance

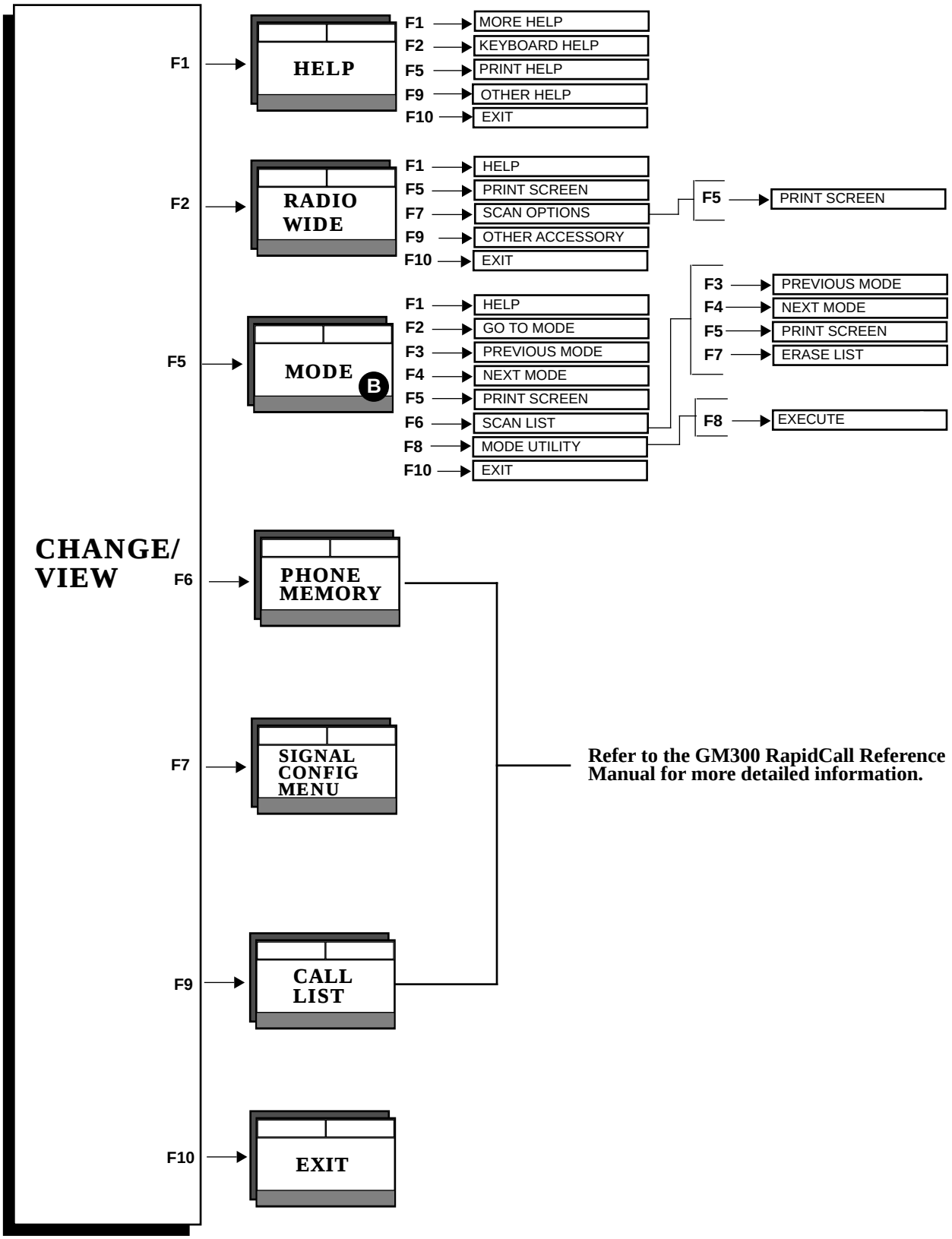


Figure 2-10. Change/View Mapping at a Glance

2.8.5 The Relationship Between Screens

Some screens contain fields that require or take values from other screens and features, and thus are dependent upon each other. For example, the signalling system values specified on the CHANGE/VIEW:SIGNAL screen are “assigned” at the CHANGE/VIEW:MODE screen's PHONE Signalling Name field (Figure 2-11).

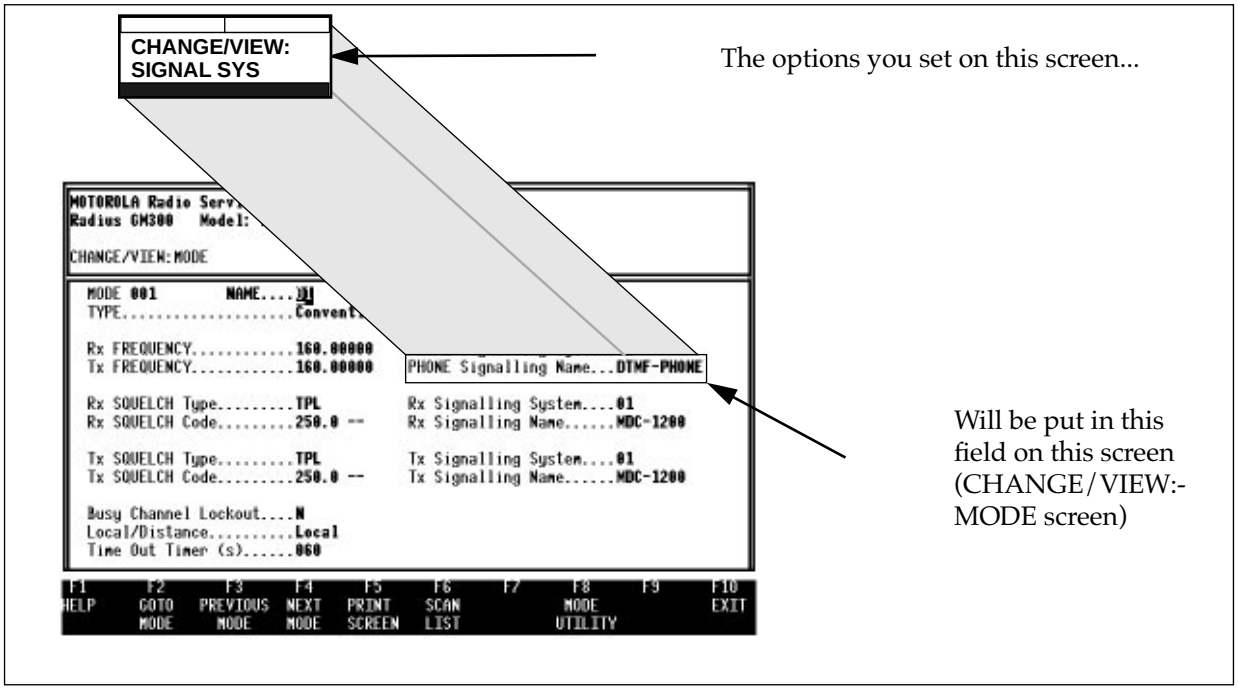

CHANGE/VIEW:
SIGNAL SYS
The options you set on this screen...
CHANGE/VIEW:MODE
PHONE Signalling Name...DTMF-PHONE
Will be put in this field on this screen (CHANGE/VIEW:-MODE screen)

Figure 2-11. Relationship Between Screens

2.9 Changing A Field Value

Screen fields come in three basic types:

- ❏ Information fields - non-editable fields which cannot be altered or changed.
- ❏ Scrollable fields - to edit or change a choice, press the arrow key(s).
- ❏ Direct-entry fields - to edit or change a choice, type in an acceptable value.

Changing a field's value is typically done by either scrolling through a list of options for scrollable fields or by typing in a correct value for direct-entry fields as shown in Figure 2-12 on page 2-34. Scrolling is done with the arrow keys.

The Reference sections in this manual, detail each feature, its default value, and its programmable choices.

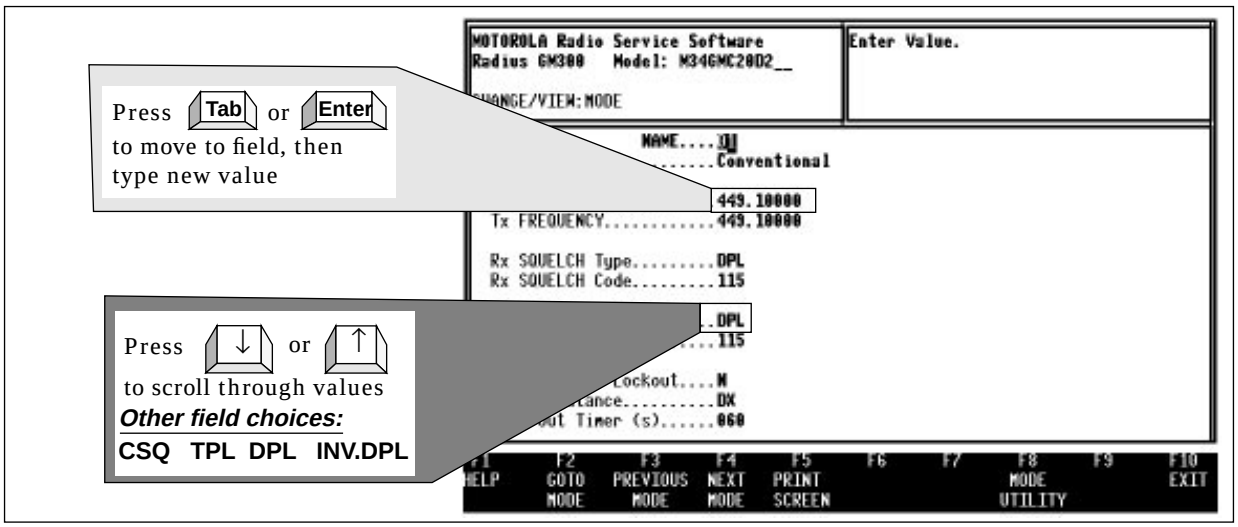


Figure 2-12. Changing a Field Value

2.10 Setting (Configuring) RSS Computer Defaults

Now that you are aware of how fields, screens and menus relate to one another, this section introduces the concept of saving certain default computer information. Setting the computer defaults eliminates the need to specify them every time you enter RSS or program a radio.

Read this section if you want to:

- ❏ Set a default archive and backup file path name so you won't have to specify it every time you save a radio archive file,
- ❏ Set or change the default port used to interface with the radio and RIB,
- ❏ Set the default colors you see on your RSS screen, or
- ❏ Eliminate the SETUP COMPUTER CONFIGURATION MENU as shown in Figure 2-13 on page 2-35 from appearing every single time you start RSS from the diskettes.

Otherwise proceed to Section 2.11 - *Exit RSS*.

If you've been with us from the start, you should be at the MAIN MENU. If you've just joined us or got lost inside the RSS screens, press Esc to get to the MAIN MENU. From the MAIN MENU, press F9 to get to the SETUP COMPUTER CONFIGURATION MENU.

From the SETUP COMPUTER CONFIGURATION MENU you can either read the on-line help, set some default computer values, or exit. Pressing F3 on the SETUP COMPUTER CONFIGURATION MENU will display the PC CONFIGURATION screen, where you can specify the default drive and path names for future archive and backup files. Pressing F7 on the SETUP COMPUTER CONFIGURATION MENU displays COLOR CONFIGURATION screen where you can specify the colors for your screen's text, lines, background and highlighted fields.

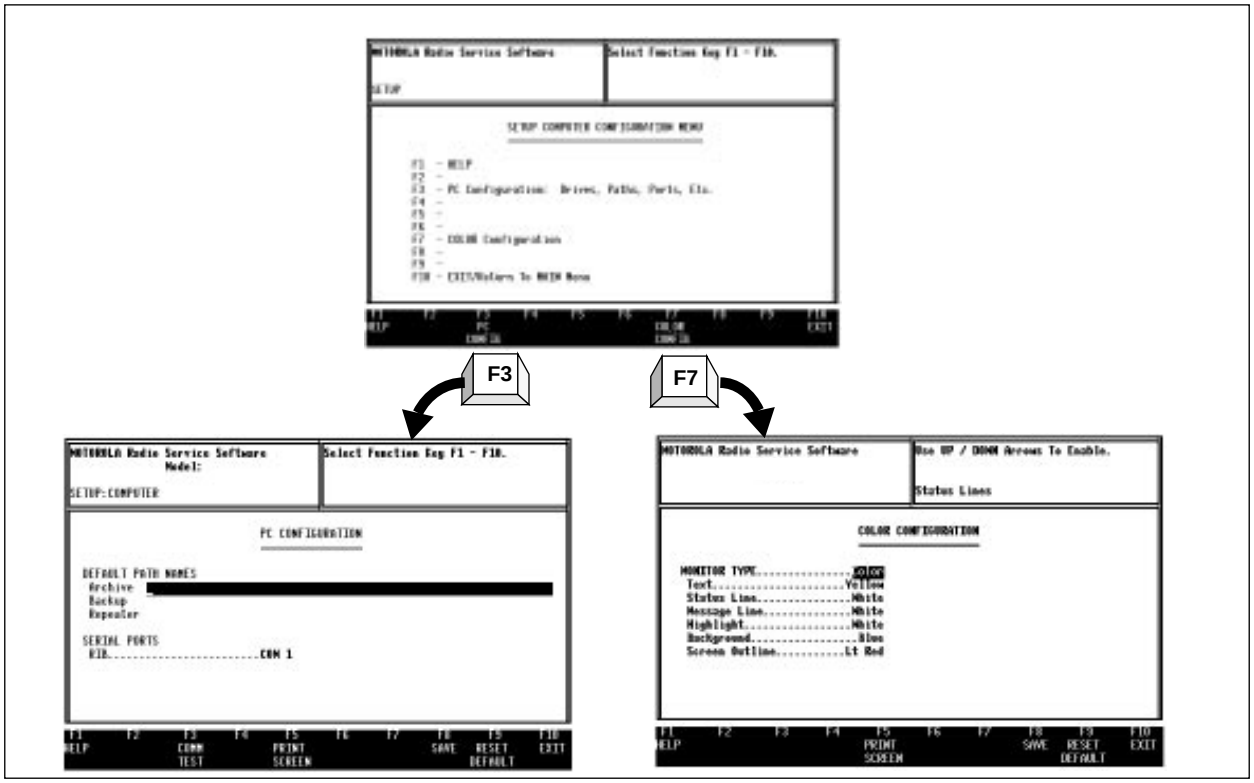


Figure 2-13. Setup Computer Configuration Menu Options

2.10.1 Setting Default Archive and Backup Paths

First, you can set the drive name and path names for both archive files and backup archive files you will create later. Making and using backup archive files can save a lot of programming time should your archive files become damaged. We highly recommend making backup files. Also, specifying a default path name here will save much typing time later every time you go to save an archive file. Here's how to set the default archive and backup file paths.

Table 2-16. Creating Archive/Backup File Paths

Instruction	What to Type	Explanation
1. Go to PC CONFIGURATION		Press F3 at the SETUP COMPUTER CONFIGURATION MENU to get to PC CONFIGURATION
2. Specify archive file path	C:\MRSS\GM300\ARCHIVE	At PC CONFIGURATION, type this archive file path name if you have a hard disk. This is where you keep you radio archive file. If you don't have a hard disk, specify one of your diskette drives: **A:**
3. Go to next field		Pressing **Tab** (or **Enter** or **Return**) advances to the next field.
4. Specify backup file path.	A:\BACKUP	Always use a diskette for backup files. Depending on the number of radios you program, you may want to make sub-directories as well. If you are already using the A drive for archive files, use the B drive for backups. Remember to correctly label the diskette's contents on the outside sticker (e.g. GM300 back-ups). Proceed to step 2 in Table 2-17 on page 2-37 to select the communications port connected to the RIB.
5. Save this configuration		**F8** save the field options displayed on the screen.

The following paragraph is a work-around for the problem of the SETUP COMPUTER CONFIGURATION MENU appearing every time you start RSS using the 5.25" diskettes. Our goal is to have it appear the first time to allow you to set your defaults once - then subsequent times eliminate it from the display, as the RSS finds the information it is looking for within a file on the diskette.

When using the 5.25" diskettes to start RSS, we recommend putting diskette #1 back into the drive before pressing F8 at the PC CONFIGURATION screen. Doing this puts the computer configuration file named GM300.CFG (tells RSS the computer's configuration and default paths) onto the diskette you use when you start RSS. If RSS finds this file when the program is started next time, it won't ask you again for the information it can find in this file, and the SETUP COMPUTER CONFIGURATION MENU will not automatically appear.

Next are the steps to specify the serial port you use for interfacing with the radio and RIB. The default port is COM1

2.10.2 Setting a Default Port

Table 2-17. Setting a Port

Instruction	What to type	Explanation
1. Go to PC CONFIGURATION		Press **F3** at SETUP COMPUTER CONFIGURATION MENU to go to PC CONFIGURATION.
2. Go to serial port RIB field		Pressing **Tab** (or **Enter** or **Return)** advances to the next field. Press **Tab** two times.
3. Select a port		Use the arrow keys to scroll through the available field options. Options are *COM1* or *COM2*. Pick a port.
4. Test the port		You can test the port by pressing **F3**, COMM TEST - if ok it will beep and in the **Instruction Area** (see number **2** in Figure 2-7) of the screen the words "Radio Communications OK" will appear.
5. Save this configuration		**F8** saves the field options on the screen. "Saved" appears in **Instruction Area** of the screen.
6. Exit screen when done		Press **F10** to exit this screen and go to previous menu.

2.10.3 Setting Default Menu and Screen Colors

Table 2-18. Selecting the Color of Menus and Screens

Instruction	What to type	Explanation
1. Go to COLOR CONFIGURATION		Press **F7** at the SETUP COMPUTER CONFIGURATION MENU to get to COLOR CONFIGURATION.
2. Specify monitor type		At COLOR CONFIGURATION, press an arrow key to scroll through the available monitor type field options. The only options for this field are *Color* and *Mono*. If you have a monochrome or LCD monitor, select *Mono* and go to Step 7. If you have a color monitor, select *Color* and go to Step 3.
3. If ***Color,*** go to next field		After selecting *Color,* press the **Tab** or **Enter** key to advance to the next field, called Text.
4. Select color for this field		Use the up or down arrow keys to scroll through the available field options. Pick a color.
5. Move to next field		Press **Tab** (or **Enter** or **Return)** to go to the next field
6. Select colors for all fields		Repeat steps 4 and 5 for each of the remaining fields
7. Save this configuration		**F8** saves the field options displayed on the screen.
8. Exit screen when done		Press **F10** to exit this screen and go to previous menu.

2.11 Exit RSS

If you want to program a radio or do a tutorial, don't exit yet. Instead, proceed to Section 3 - *Tutorials* section. Whenever exiting RSS, always ask yourself these questions:

- ❏ Did you apply the changes to the radio (save to the radio)?
- ❏ Did you apply the changes to a computer file (save archive file)?
- ❏ Did you save the changes to a backup computer file (save backup file)?

If you do want to exit, use the Esc key to return to the MAIN MENU, then press F10 twice to exit to the DOS prompt.

The tutorials that follow in Section 3 - *Tutorials* will give you a working knowledge of RSS and the ability to proceed with more advanced feature programming.

3 Tutorials

3.1 Overview

The tutorials in this section can be used to personalize radios for customers. We've created an imaginary but practical scenario to demonstrate the need for radios programmed with different features for various applications. In each tutorial, the setting is the Longwood Hotel and Convention Center, a full-service hotel and convention facility specializing in large-scale corporate meetings. The Longwood Center must prepare for a major upcoming radio convention which will offer extended lodging, exposition and banquet facilities. There are three major communication requirements involved in the setup of the convention which fall into the following areas:

- ❏ Convention setup and maintenance staff

  Needs radios to coordinate forklift and towing services involved in preparing the exposition display floor.
- ❏ Security staff

  Needs radios to provide crowd control and security force patrol at the exposition center, at the hotel, in the parking garage and on the complex grounds.
- ❏ Banquet and food commissaries

  Needs radios to provide internal and external coordination of catering and banquet resources using a van fleet.

The first tutorial (Programming Basic Radios) walks you through the steps of programming a new, basic 8-channel radio and takes approximately 45 minutes to complete. An on-line demo version of this tutorial is on the RSS demo diskette. To view it, type DEMO1. To quit the demo, press the Esc or Del key. We suggest you view the demo after reading Section 3.2.4 - Step-by-Step Programming Instructions of the tutorial.

The second tutorial (Cloning Radios) goes much faster, and involves cloning (copying) the personality data from an archive file of one pre-programmed radio to other radios. Cloning is used when there is a need for multiple radios equipped with the same radio features and functions.

Each tutorial provides the following:

1. Sets the scene
2. Lists the desired features for the particular application
3. Gives an overview in a list format of the major steps involved in programming the radio
4. Walks you through the specific steps to program the features into the radio.

The tutorials assume that RSS is running and the MAIN MENU is displayed. If the MAIN MENU is not displayed, refer to Table 3-1.

For all tutorials, F1 displays help information corresponding to the current highlighted field or current screen. F10 backs you out of RSS one menu level at a time. Esc goes directly to the MAIN MENU.

Table 3-1. Steps to Bring Up RSS MAIN MENU

Using Two Diskette Drives	Using Hard Drive
1. Assemble, connect and power up the hardware. 2. Load DOS from drive A. After the computer has successfully booted, the prompt will be **A:**. 3. Insert the "working copy" RSS diskette into drive B, then move to drive B by typing the command below, followed by **Return** (If using 5.25" diskettes, insert diskette #1 first.) **B:** 4. Type the command below, followed by **Return**: **GM300** (If using 5.25" diskettes, remove diskette #1 and insert diskette #2 when the RSS instructs you.) 5. If this is the first time this RSS version is started and the CONFIGURE COMPUTER SCREEN appears, you can either skip this screen by pressing **F10**, or work through it (see Figure 2-4 on page 2-25) to set up your archive path, display colors and choice of COM ports, then save the configuration (**F8**) and exit the screen (**F10**). 6. Press any key at the BANNER screen (see Figure 2-5 on page 2-25). 7. The MAIN MENU appears.	1. Assemble, connect and power up the hardware and the computer. 2. After the computer has successfully booted, the prompt will be **C:**. 3. If you have not yet installed the latest RSS version, see the Starting RSS subsection to make a backup RSS copy and to install it on your hard disk. 4. Type the command below, followed by **Return**: **GM300** 5. If this is the first time this RSS version is started and the CONFIGURE COMPUTER SCREEN appears, you can either skip this screen by pressing **F10**, or work through it (see Figure 2-4 on page 2-25) to set up your archive path, display colors and choice of COM ports, then save the configuration (**F8**) and exit the screen (**F10**). 6. Press any key at the BANNER screen (see Figure 2-5 on page 2-25). 7. The MAIN MENU appears.

3.2 Programming Basic Radios

This tutorial gives step-by-step instructions for programming the 8-channel Radius GM300 mobile radio.

3.2.1 Scenario

The Longwood Hotel and Convention Center's setup and maintenance staff needs a basic 8-channel radio to coordinate the forklift and towing services required in the setup of the exposition's display floor. A central dispatcher will direct the setup activities by communicating with the mobile forklift and truck drivers.

3.2.2 Desired Features

The convention setup and maintenance radios will need the following features:

- ❑ A Transmit Frequency
- ❑ A Receive Frequency
- ❑ Private Line/Digital Private Line (TPL/DPL) Codes
- ❑ Carrier Squelch
- ❑ Time-Out Timer (TOT)

3.2.3 Major Decisions Involved

To program the desired features above, the approach with the RSS will be:

- ❑ Decide which radio model to use.
- ❑ Decide which frequencies to use.
- ❑ Pick the number of modes (channels) desired.
- ❑ Decide which feature systems to use (basic, scan, signalling).
- ❑ Decide which features to program radio-wide (all channels).
- ❑ Decide which features to program per-mode (individual channels only).
- ❑ Do the step-by-step specific programming instructions.

3.2.4 Step-by-Step Programming Instructions

Table 3-2 on page 3-4 is a chart of the desired features for each mode of the radio being programmed in this tutorial. Check them off as you do them in the sections to follow. See Appendix I for a blank form you can use for future radios.

Table 3-2. Radio Personality Chart

RADIO PERSONALITY CHART									
Feature Name	Radio Wide	Mode 1 #____	Mode 2 #____	Mode 3 #____	Mode 4 #____	Mode 5 #____	Mode 6 #____	Mode 7 #____	Mode 8 #____
Tx Frequency									
Rx Frequency									
PL codes									
Squelch									
Time Out Timer (TOT)									
Busy Channel Lockout									
Tx Inhibit on Busy									
Signalling Systems									
KEY: ✔ = origi- ✚ = feature ✚✚ = feature ■ =									

3.2.4.1 *Read Current Radio's Personality (Codeplug)*

Before programming the radio with some features, you must read and access the current radio's personality (codeplug data).

Table 3-3. Steps to Read a Radio's Personality (Codeplug)

Instruction	What to type	What it does or means
1. Go to GET/SAVE menu		Press **F3** at the MAIN MENU to get to the GET/SAVE Menu.
2. Get radio's current codeplug data		At the GET/SAVE menu, press **F2** to execute the function. In the Instruction Area of the screen, the message "Accessing Serial Bus" will flash a few times while the RSS is retrieving the radio's codeplug data. If it does not, make sure that all the cables are properly connected and that both the radio and RIB are powered up.

3.2.4.2 *Program The Radio-Wide Features First*

After the radio's codeplug data is read, the RSS allows you to access the CHANGE/VIEW menu. From here you can program the features you want on every channel, and the ones you want common to all channels. First you'll program the common (radio-wide) ones.

Table 3-4. Steps to Program Radio-Wide Features

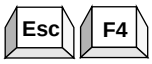
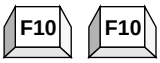
Instruction	What to type	What it does or means
1. Go to CHANGE/VIEW menu		(Press **Esc** to back up to MAIN MENU.**)** Press **F4** at the MAIN MENU to see the CHANGE/VIEW Menu.
2. Go to RADIO-WIDE screen		At the CHANGE/VIEW menu, press **F2** to see the RADIO-WIDE screen. The TOT Rekey Time field should be highlighted.
3. Select choice		
4. Go to TOT Rekey Time		Pressing **Tab** advances the prompt to the next field
5. Select choise		
6. Go to Forced Monitor field		Pressing **Tab** advances the prompt to the next field.
7. Select choice		
8. Go to Handset field		Pressing **Tab** advances the prompt to the next field.
9. Select choice		

Table 3-5. Steps to Program Radio-Wide Scan Features

Instruction	What to Type	What it does or means
1. Go to SCAN OPTIONS screen		From the RADIO-WIDE screen press F7 to see the SCAN OPTIONS screen. Thge PRI Sampling Method field should be highlighted.
2. Select Choice		
3. Go to Scan Speed field		Pressing Tab advances the prompt to the next screen.
4. Select Choice		
5. Go to User PRI2 Allowed field		Pressing Tab advances the prompt to the next screen.
6. Select Choice		
7. Go to PRI Sampling Rate field		Pressing Tab advances the prompt to the next field.
8. Select Choice		
9. Go to PRI Channel Tone field		Pressing Tab advances the prompt to the next field.
10. Select Choice		
11. Go to Scan Hang Time field		Pressing Tab advances the prompt to the next field.
12. Select Choice		
13. Go to Scan Talk Back field		Pressing Tab advances the prompt to the next field.
14. Select Choice		
15. Return to CHANGE/VIEW menu		From the SCAN OPTIONS screen press F10 to return to the RADIO-WIDE screen, then press F10 to return to the CHANGE/VIEW menu.

3.2.4.3 *Program The Per-mode Features*

Now that the radio-wide features are programmed, you can now program the per-mode features. Figure 3-1 shows the MODE CONFIGURATION screen. You will become very familiar with this screen, as you will change the field options on this screen for each mode you program on a "per-mode" basis.

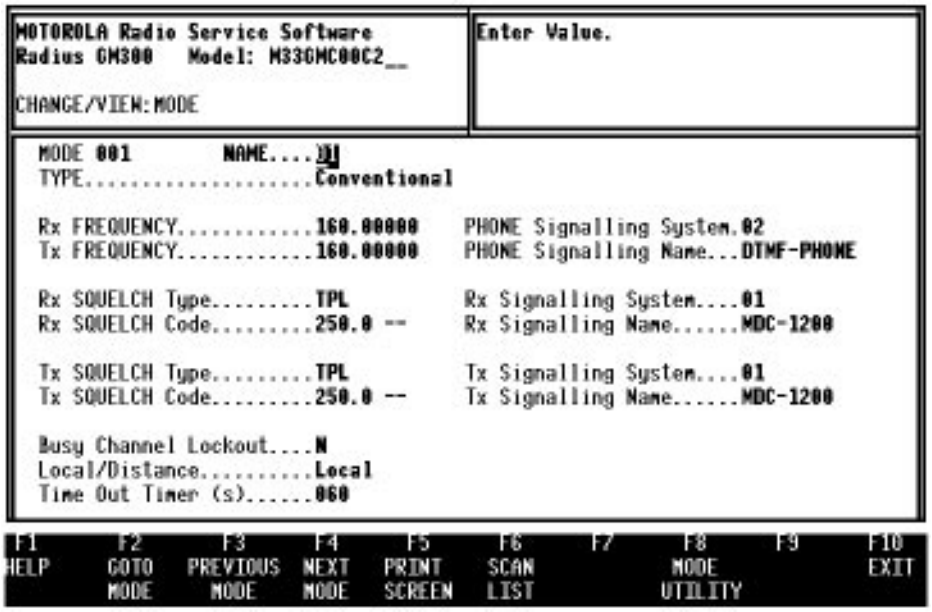


Figure 3-1. Per-Mode Features on MODE screen

To keep track of where you are, use Table 3-2 on page 3-4 to check off the features, per mode, after you program them. In Table 3-6 on page 3-8, the Enter or Return key can be used instead of the Tab key.

Table 3-6. Steps to Program Per-Mode Features

Instruction	What to type	What it does or means
1. Go to CHANGE/VIEW menu	F4	(Press **Esc** to back up to MAIN MENU.**)** Press **F4** at the MAIN MENU to see the CHANGE/VIEW Menu.
2. Go to MODE CONFIG menu	F5	At CHANGE/VIEW menu, press **F5** to go to MODE CONFIGURATION menu. You will be at mode 1.
3. Go to Name field		The prompt will be on the Name field when you move to this screen, as it is the first field.
4. Select a Name		
5. Skip Type field	Tab	The Type field cannot be accessed at this time.
6. Go to Rx Frequency field	Tab	Pressing **Tab** advances the prompt to the next field.
7. Select an Rx Frequency		A frequency number can be typed in or selected.
8. Go to Tx Frequency field	Tab	Pressing **Tab** advances the prompt to the next field.
9. Select a Tx Frequency		A frequency number can be typed in or selected.
10. Go to Rx Squelch type field	Tab	Pressing **Tab** advances the prompt to the next field.
11. Select an Rx Squelch type	↓	
12. Go to Rx Squelch Code field	Tab	Pressing **Tab** advances the prompt to the next field.
13. Select an Rx Squelch Code	↓	
14. Go to Tx Squelch Type field	Tab	Pressing **Tab** advances the prompt to the next field.
15. Select a Tx Squelch Type	↓	
16. Go to Tx Squelch Code field	Tab	Pressing **Tab** advances the prompt to the next field.
17. Select a Tx Squelch Code	↓	
18. Go to Busy Channel Lockout field	Tab	Pressing **Tab** advances the prompt to the next field.
19. Select BCL choice	↓	
20. Go to Local/Distance field	Tab	Pressing **Tab** advances the prompt to the next field.
21. Select a Local/Distance value	↓	
22. Go to Time-Out Timer field	Tab	Pressing **Tab** advances the prompt to the next field.
23. Select a Time-Out Timer value.	↓	

Table 3-6. Steps to Program Per-Mode Features (Cont'd.)

Instruction	What to type	What it does or means
24. Program the next mode	F4	Repeat steps 4-11 for each mode (channel).
25. Create additional mode	F4 ↓	Press **F8** at the MODE CONFIGURATION menu to go to the MODE UTILITY screen, then press the down arrow key to scroll through the mode utility list until the ADD mode choice appears.

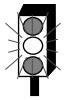
3.2.4.4 *Program The Personality Into The Codeplug (Radio)*

Now that you have set values for all the features you want, it's time to actually program them into the radio. Programming the personality into the radio's codeplug must be done after creating or editing the personality of a radio or else the changes will be lost.

Note: Make sure that the radio is connected to the Radio Interface Box (RIB) and that both the RIB and radio are powered up before pressing F8. On newer RIBs that have a built-in battery supply, make sure the power LED is on. If you have serial bus errors or other warnings, try a fresh RIB battery even though the power LED may be on.

Table 3-7. Steps to Save Personality to Radio's Codeplug

Instruction	What to type	What it does or means
1. Go to GET/SAVE menu	F3	Press **Esc** to back up to MAIN MENU.) Press **F3** at the MAIN MENU to see the GET/SAVE menu.
2. Go to PROGRAM CODEPLUG	F7	Pressing **F8** at the GET/SAVE menu advances you to the PROGRAM CODEPLUG screen, where the current data stored in the computer's RAM (what you can see on the RSS screens) is programmed to the radio's codeplug.
3. Complete the programming	F2	A warning box appears to verify what you are about to do. The choices are **F2** to complete the programming or **F10** to abort the programming. Press **F2** to complete.



When programming or calibrating a radio DO NOT disconnect the radio from the RIB when the computer is communicating with the radio - it may leave the radio in an inoperable state. The only recommended time to disconnect the radio is at the MAIN MENU or GET/SAVE screens.

3.2.4.5 *Save The Personality To An Archive File*

You've just saved the personality to the radio, but it's important to save it on disk too. Below are the steps to save the radio's personality to an archive file and a backup file.

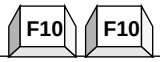
Table 3-8. Steps to Save Radio Personality to Archive and Backup Files

Instruction	What to type	What it does or means
1. Go to GET/SAVE menu		(Press **Esc** to back up to MAIN MENU.**)** Press **F3** at the MAIN MENU to see the GET/SAVE menu.
2. Go to SAVE ARCHIVE FILE		Press **F7** at GET/SAVE to see SAVE ARCHIVE FILE screen. This displays the archive diskette drive and path name, current model number, current radio serial number, and customer ID. If there is no customer ID, it can be added at this time.
3. Specify archive file path	C:\MRSS\GM300\ARCHIVE	This is where we recommend you save your radio personality archive files for GM300 radios.
4. Specify backup path	B:\	Specify the root directory of the diskette inserted in drive B to be the backup file location.
5. Insert formatted diskette		Put a formatted diskette (or use your existing archive file diskette) into drive A so the RSS will save your backup archive file.
6. Save the file		Pressing **F8** at the SAVE ARCHIVE FILE screen saves the data in an archive file specified above. (**F2** allows you to change the disk path and drive name.)
7. Save backup file		After saving the archive file, the RSS will ask for the backup diskette if it is not already inserted into the drive. Follow the instructions.

3.2.5 Exit RSS

You now have a foundation for programming more radios. If you don't want to proceed to the next tutorial, *Cloning Radios*, then use the steps outlined in Table 3-9 to exit RSS. To retain a good portion of what you've learned so far, please review this material or program another radio within 48 hours.

Table 3-9. Steps to Exit the RSS

Instruction	What to type	What it does or means
1. Go to MAIN MENU		Press **Esc** to back up to MAIN MENU.
2. Exit to DOS		Press **F10** twice to exit to DOS.

3.3 Cloning Radios

To clone, radios must be of the same model type and version.

3.3.1 Scenario

To make the best use of their time, the Longwood Hotel and Convention Center's setup and maintenance staff will need at least two tow trucks and two forklifts equipped with identical Radius GM300 mobile radios, as their duties are very similar.

3.3.2 Desired Features

The desired features are the exact same ones listed in the previous tutorial.

3.3.3 Major Decisions Involved

The major steps for cloning in this tutorial are reduced from the six steps in the first tutorial to three steps here, as most of the questions were answered by the decision to have identical radio personalities for all setup and maintenance operations.

To program the cloned radio, the approach will be:

- ❏ Pick Desired Archive File.
- ❏ Decide Whether to Change IDs.
- ❏ Decide How Many Radios to Clone.

3.3.3.1 *Pick Desired Archive File*

To clone, the radios must be from the same product family, must be of the same model type and product vintage. In this case, you will use the archive file created and saved in the first tutorial, A999999.999.

3.3.4 Step-by-Step Specific Cloning Instructions

In this subsection, you will:

- ❏ Read (get) into the RSS the specific file you want to clone from (source file),
- ❏ Clone that source file into the current radio's codeplug (target),
- ❏ Clone the remaining two radios the same way, and then
- ❏ Exit RSS.

3.3.4.1 *Read Desired Source Archive File*

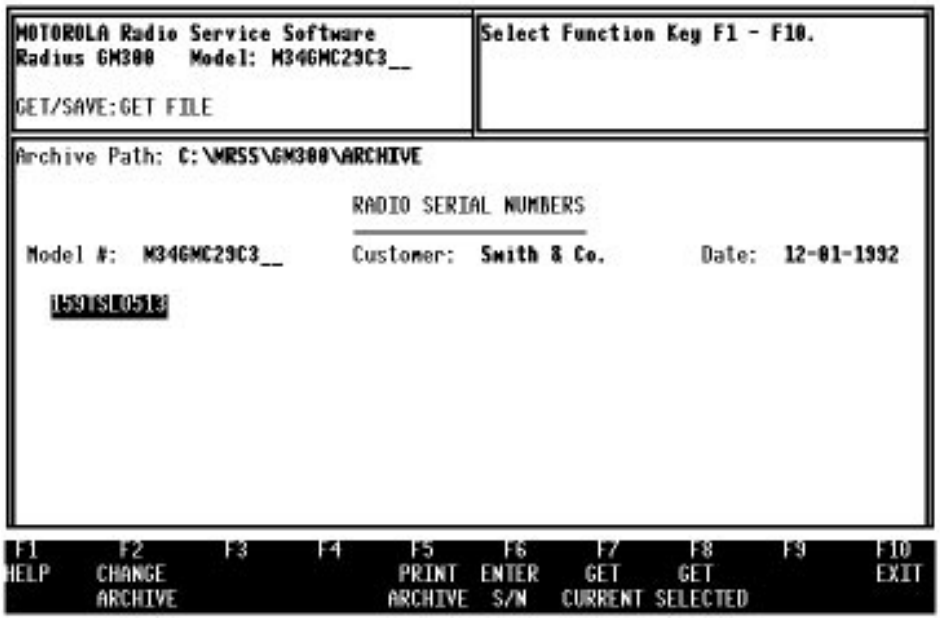


Figure 3-2. Reading (Getting) an Archive File from Disk

3.3.4.2 *Clone Current Radio From Archive File*

Radio codeplugs consist of both personality and tuning data. Cloning allows you to "merge" two codeplugs together. The archive file or radio with the desired personality is referred to as the source file or source radio. The other file is referred to as the target radio. The result is an image that can be programmed into a radio and/or saved to an archive file. This image will have the source codeplug's personality, yet the tuning data of the target codeplug remains unchanged. In this tutorial, the source personality is the file saved in the first tutorial, and the target radios are the three radios not yet programmed. The procedures listed in Table 3-10 on page 3-13 should be followed:

Note: The IDs for MDC-1200, Quik Call II, DTMF, etc. must be changed manually if you want to have unique IDs. You may do this by going to CHANGE/VIEW immediately after cloning each radio.

Table 3-10. Steps to Clone Radios

Instruction	What to type	What it does or means
1. Go to GET/SAVE menu		(Press **Esc** to back up to MAIN MENU.) Press **F3** at the MAIN MENU to see the GET/SAVE menu.
2. Go to GET ARCHIVE FILE		Press **F3** at GET/SAVE menu to go to GET ARCHIVE FILE screen. (A list of files is displayed which look like serial numbers) that the RSS program found under the directory path shown.)
3. Type in path name	C:\MRSS\GM300\ACRHIVE	This tells RSS to display the file names found in this directory. You will see the file named A9999999.999 that you saved in the first tutorial.
4. Select desired file		Press **Tab** until the A9999999.999 file is highlighted.
5. Get selected file		Get the selected (highlighted) file.
6. Connect target radio		Assemble the hardware and connect the radio you want cloned.
7. Save source into target radio		After Step 5 you should be back at the GET/SAVE menu. Press F5 from GET/SAVE to clone the current radio's codeplug with the selected source file's personality. The cloning process will check for compatibility of the two radios automatically. You will receive an error message if cloning cannot be performed. If for any reason the radios cannot be cloned, an error message will appear. Check all connections or refer to Appendix A (Error Code Explanations) and B (Troubleshooting Problems).
8. Disconnect radio		When Step 7 is finished, you can disconnect the radio. In a matter of seconds the second radio was cloned. Disconnecting the radio should only be done at the GET/SAVE menu or the MAIN MENU, or the radio may be left in an inoperable state.
9. Proceed to step 1 in next table.		

3.3.5 Clone Remaining Radios

Table 3-11. Cloning Additional Radios

Instruction	What to type	What it does or means
1. Do Steps 1-5 in Table 3-10.		Do steps 1-5 in Table 3-10.
2. Connect next target radio		Connect cable from RIB to the radio.
3. Clone the radio		Press **F5** at the GET/SAVE menu to clone the radio. This saves (reads) the source file into the current radio. The cloning process will check for compatibility of the two radios automatically. You will receive an error message if cloning cannot be performed.
4. Disconnect radio		When Step 3 is finished, disconnect the radio.
5. Clone remaining radios		Repeat Steps 2-4 for the last two radios. If for any reason the radios cannot be cloned, an error message will appear. Check all connections or refer to Appendix A (Error Code Explanations) and B (Troubleshooting Problems).

3.3.5.1 *Exit RSS*

To exit RSS, follow the steps in Table 3-9 on page 3-11.

In a matter of minutes three more radios were programmed identically to the first one. Additional features can be added by following the programming procedures in the corresponding reference pages in the Reference sections that follow.

4 Basic Features

4.1 Overview

The feature chart (Table 4-1 on page 4-2) shows a complete list of GM300 radio features.

Only one feature or function is shown on a page. On each reference page you will find a standard page layout with consistent categories of information. Below is a list and explanation of all the categories. The categories with an asterisk (*) appear on every reference page. The other categories appear only when they apply to the specific feature.

- **FEATURE NAME*** Identifies the name of the reference feature.
- **RSS LOCATION*** Provides a quick visual map of where you'll find a particular feature within the RSS, showing the keys to press to arrive at the feature's or function's screen location. More details of this map follow in the PROGRAMMING PROCEDURE section.
- **DEFINITION*** Summaries the feature's function - it defines and briefly explains the feature.
- **DEFAULT/CHOICES*** Identifies and explains both the default value the feature is automatically set to (with no user input) and the other available choices a user can select.
- **DEPENDENCIES** Identifies items that have a direct impact or influence upon the feature.
- **EXCEPTIONS** Identifies when the general rules concerning a feature may not apply.
- **RECOMMENDATIONS** Provides advice for the most common applications and usages, and informs you when things work best.
- **WARNINGS** Identifies areas of caution and important concerns. Be sure to read and act upon warnings. They are more serious in nature than IMPORTANT NOTES.
- **IMPORTANT NOTES** Explains other issues to consider.
- **PROGRAMMING PROCEDURES*** Summaries how to access and change a given feature. It explains the RSS LOCATION mapping in more detail.

4.2 GM300 Features

Table 4-1. GM300 Features

Feature	8 Channel	16 Channel	Feature	8 Channel	16 Channel
Radio Wide Features			Scan Features		
Accessory External		X	Priority 2 Mode		X
Accessory Internal		X	Priority Channel Tone	X	X
Accessory Custom		X	Priority Sampling Method	X	X
TOT Rekey Time	X	X	Priority Sampling Rate	X	X
Forced Monitor	X	X	Scan Hang Time	X	X
Handset	X	X	Scan Talk Back	X	X
By-Mode Features			Scan Speed	X	X
Busy Channel Lockout	X	X	User PRI 2 Allowed	X	X
Local/Distance	X	X	Accessory Connector Features		
Phone Signalling System		X	Active Level		X
Rx Frequency	X	X	Data Direction		X
Rx Signalling System		X	Debounce		X
Rx Squelch Type	X	X	External Accessories		X
Rx Squelch Code	X	X	Function Descriptions		X
Time-Out Timer	X	X	Internal Accessories		X
Tx Frequency	X	X	PIN #		X
Tx Signalling		X	Power Up Delay		X
Tx Squelch Type	X	X	Rapidcall Signalling Features		
Tx Squelch Code	X	X	Please Refer to the Rapidcall Signalling Reference for a description of these features		
Other Features					
Select V		X	Please Refer to the Rapidcall Signalling Reference for a description of these features		
Call Lists		X			
Phone Dialer		X			

Busy Channel Lockout

RSS LOCATION

DEFINITION

Limits audible conversations from other user groups and reduces transmissions on top of other user groups.

DEFAULT/CHOICES

Default: **N**

Choices: ■ ***Y*** ■ ***N***

DEPENDENCIES

Receive squelch type not equal to carrier squelch.

EXCEPTIONS

Does not apply when receive squelch type is equal to carrier squelch, therefore it is incompatible with Tx Inhibit on Busy.

RECOMMENDATIONS

Use when you don't want to hear anybody else's conversations, or when you don't want one user group "eavesdropping" on another. Compatible with Rapid-call signalling and scan.

WARNINGS

Not compatible with carrier squelch channels. May cause operational difficulties when talking through community repeaters. Operation is less reliable when used with Channel Scan, since it is more probable that you will key up on another group.

IMPORTANT NOTE

If you press PTT on radio while there is a carrier on the channel, the radio follows this protocol:

a. If the carrier has your TPL/DPL, then you are allowed to transmit just like normal
b. If the carrier has no TPL/DPL or the wrong TPL/DPL, then you will hear a busy tone while you hold PTT. Release PTT and try again later.

A short carrier 'break' is required to return to the BCL protected state.

SEE ALSO

Tx Inhibit On Busy.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Busy Channel Lockout field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Busy Channel Lockout value.
3. At the MODE CONFIGURATION screen, select the mode number that you want to change Busy Channel Lockout value by pressing either the **F3** or **F4** keys until the desired mode number is displayed in the Name field.	6. To change the Busy Channel Lockout value on other modes, repeat steps 3-5.

Forced Monitor

RSS LOCATION

DEFINITION

Forces radio to be in monitor (Rx PL disabled) before radio can be keyed. When PTT is pressed when not in monitor, the operator will hear a low-pitched (error) tone and the monitor light will illuminate. Pressing PTT a second time will cause the radio to key.

DEFAULT/CHOICES

Default: **OFF**

Choices: ■ ***OFF*** ■ ***ON***

RECOMMENDATIONS

Use to force operator to monitor channel before transmitting or in markets where this is a regulatory requirement. Normally not needed unless customer does not want to use the microphone hang-up feature.

WARNINGS

Using this feature with Busy Channel Lockout or Transmit Inhibit On Busy is not recommended. Busy Channel Lockout rules prevail when both features are enabled.

SEE ALSO

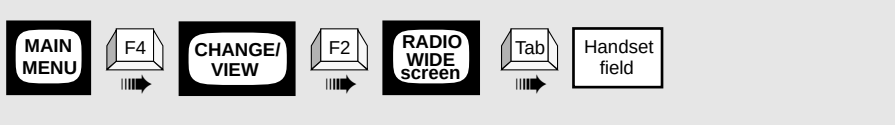
Busy Channel Lockout, Transmit Inhibit On Busy

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select the desired Forced Monitor value.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	
3. Press **Tab** (or **Enter** or **Return**) until the Forced Monitor field is highlighted.	

Handset

RSS LOCATION



DEFINITION Selects how receive audio is routed for handset. Mutes loudspeaker when handset is removed from hang-up cup, enables loudspeaker when handset is hung up.

DEFAULT/CHOICES **Default: N**

Choices: ■ ***Y*** ■ ***N***

RECOMMENDATIONS Use when the handset is connected to the radio.

WARNINGS If this feature is enabled, and a handheld microphone is used, you will not hear the audio speaker when microphone is off-hook.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select the desired Handset value.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	
3. Press **Tab** (or **Enter** or **Return**) until the Handset field is highlighted.	

Local/Distance

RSS LOCATION

DEFINITION A feature that affects radio sensitivity and interference rejection.

DEFAULT/CHOICES **Default: Local**

Choices: ■ ***Dx*** ■ ***Local***

Local Use Local in areas of dense radio usage (suburbs and major cities). Local improves IM performance dramatically, but loses some sensitivity.

Dx Use Dx (distance) when in an area where radio is decoding weak signals (rural area).

RECOMMENDATIONS Use Local when in an area where there is a lot of interference (in the city). When frequently traveling between local and distant areas, use two channels with the same frequencies, only program one as Local and one as Dx. This way you can simply switch from the local channel to the distance channel as you travel from the city to a more rural area. Most control stations should be Local.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Local/Distance field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Local/Distance value.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to change the Local/Distance value by pressing either the **F3** or **F4** keys until the desired mode number is displayed in the Name field.	6. To change the Local/Distance value on other modes, repeat steps 3-5.

Mode Name

RSS LOCATION

DEFINITION The number to be displayed on the front of the radio for this mode.

DEFAULT/CHOICES **Default: The current channel number.**

Choices: 1 through 99

The number you type here will be the number displayed on the front of the radio. For example, the radio could have three modes, named 1, 5 and 98.

RECOMMENDATIONS Use when your customer needs the channels in a specific sequence for compatibility with existing radios. It can also be used when a customer wants to "ship" channel positions.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the mode Name field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Name.
3. At the MODE CONFIGURATION screen, select the mode number that want you to change by pressing either the **F3** or **F4** keys until the desired mode number is displayed in the Name field.	

Rx Frequency

RSS LOCATION

DEFINITION A designated frequency in MHz for receiving messages and signals.

DEFAULT/CHOICES See Motorola catalog, price sheets or your service manual for valid Rx frequencies.

A radio will receive on this frequency when the radio display shows the corresponding "mode name". Frequencies must be within the advertised band and divisible by 5 kHz or 6.25 kHz (12.5 kHz or 25 kHz for 800 MHz/900 MHz bands). These frequencies may have poor receive performance due to self-quieting:

We do not recommend using these frequencies due to possible self-quieting. Contact Product Services for other frequencies.

RECOMMENDATIONS If the mode will be receive only, type BLANK for the Tx Frequency.

A "talk-around" frequency is entered by making the Tx frequency equal to the Rx frequency.

WARNINGS Cannot have a null or blank frequency. If you need blank Rx channels, then delete the mode or use mode naming.

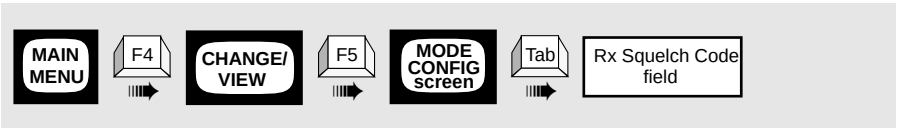
SEE ALSO Tx Frequency, Rx Squelch Code and Rx Squelch Type

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Rx Frequency field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Type in the desired Rx Frequency in MHz. Be sure to type in the decimal point too. (You could scroll through the list too using an arrow key.)
3. At the MODE CONFIGURATION screen, select the mode number for which you want to program contains the Rx Frequency by pressing either the **F3** or **F4** keys until the desired mode # is displayed in the Name field.	6. To change the Rx Frequency on other modes, repeat steps 3-5.

Rx Squelch Code

RSS LOCATION



DEFINITION

Receiver unmutes if carrier with this specific subaudible code is present. Receiver unmutes when it detects this code, allowing more users and privacy on a frequency.

DEFAULT/CHOICES

Default: **BLANK**

Choices: ■ ***see TPL/DPL tables (Appendix C) or press F1 to display help***

If the Rx Squelch Type = TPL, then enter a frequency in hertz (Hz) or any code from Appendix C.

If Rx Squelch Type = DPL, type a 3-digit numeric code from the table in Appendix C.

DEPENDENCIES

Rx Squelch Type.

EXCEPTIONS

If a Rx Squelch Type = Carrier Squelch, then squelch code is not available.

RECOMMENDATIONS

Use when you want to have multiple groups using same frequency or when you want more privacy.

Receiver response time of the PL detector can be improved slightly, for some codes, by detuning the PL code frequency by ±0.1 Hz.

IMPORTANT NOTE

TPL tones above 220 Hz will have more bleed-through to the speaker. DPL code 645 is a reserve code and will have a greater false opening probability. TPL codes near 120 Hz and 180 Hz have a high false opening probability due to 60 Hz AC power harmonies. Countries having 50 Hz AC power may have false opening on 100 Hz (code 1Z) and 150 Hz. TPL 134 Hz can be false-opened by DPL dekey.

SEE ALSO

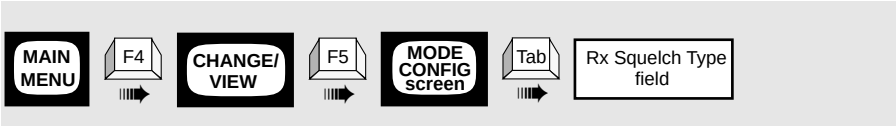
Rx Squelch Type

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Rx Squelch Code field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Rx Squelch Code or type in the desired code directly.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to program the desired Rx Squelch Code by pressing either the **F3** or **F4** keys until the desired mode # is displayed in the Name field.	6. To change the Rx Squelch Code on other modes, repeat steps 3-5.

Rx Squelch Type

RSS LOCATION



DEFINITION

Determines what form of continuous subaudible code (along with carrier) is needed to open receive audio.

DEFAULT/CHOICES

Default: **CSQ**

Choices: ■ ***CSQ*** ■ ***TPL*** ■ ***DPL*** ■ ***INV.DPL***

CSQ Carrier Squelch. For receiver to unmute for all carriers.

TPL Tone Private Line, CTCSS. If you want the receiver to unmute only specific carriers with specific codes, use TPL or DPL. For TPL you can type either the frequency in MHz or a 2-digit tone code (see Appendix C).

DPL Digital Private Line, Digital CTCSSS. If you want the receiver to unmute only specific carriers with specific codes, use TPL or DPL. For DPL, enter a 3-digit tone code (see Appendix C).

INV.DPL Inverted DPL is only needed if a customer's system has an audio path "flipped".

DEPENDENCIES

Rx Squelch Type

RECOMMENDATIONS

Use when you want to have multiple groups using the same frequency or when you want more privacy.

WARNINGS

Do not use Inverted DPL (INV.DPL) for new systems! Inverted DPL is needed only for special applications, such as a "flipped" audio path or a multi-hop repeater.

SEE ALSO

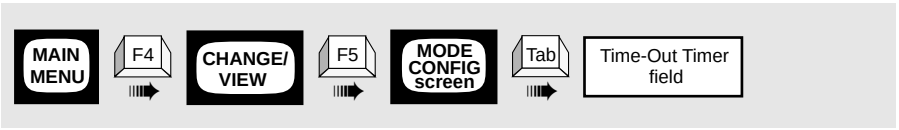
Rx Squelch Code

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Rx Squelch Type field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press F5 to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Rx Squelch Type.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to program the desired Rx Squelch Type by pressing either the F3 or F4 keys until the desired mode # is displayed in the Name field.	6. To change the Rx Squelch Type on other modes, repeat steps 3-5.

Time-Out Timer (TOT)

RSS LOCATION



DEFINITION

Limits the time allowed for any continuous transmission. When time limit is reached, the radio dekeys and a constant tone is heard until PTT is released.

DEFAULT/CHOICES

Default: 60 seconds

Choices: ■ ***Off*** ■ ***1-255 seconds***

Increments: 1 second - scroll or direct-entry

Off To turn TOT off, type in a 3-digit value, such as "OFF" or "000". (One zero followed by pressing the space bar two time will also work. A single zero (0) will not work. Two zeros will not work.)

1 - 255 Specify TOT time in seconds, ranging from one second to 255 seconds.

RECOMMENDATIONS

Set for 60 seconds. Should be used when you want to limit the amount of time one person can continuously talk. This eliminates accidentally tying up the channel. If you do not wish to limit the amount of time one person can continuously talk, set value to be a very large time (255 seconds). Only when it is absolutely needed should you choose OFF.

Time-Out Timer is useful to eliminate stuck mics and other channel abuse.

IMPORTANT NOTE

Rx operation is not affected.

SEE ALSO

TOT Rekey Time

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the TOT field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired TOT value or type in the value directly.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to change Time-Out Timer value by either the **F3** or **F4** keys until the desired mode number is displayed in the Name field	6. To change the TOT value on other modes, repeat steps 3-5.

Time-Out Timer (TOT) Rekey Time

RSS LOCATION

DEFINITION

The wait time before transmitting after reaching the maximum allotted time for continuous transmission. Ensures that time is available after reaching the maximum allotted time for continuous transmission for other conversations to begin.

DEFAULT/CHOICES

Default: **OFF**

Choices: ■ ***OFF*** ■ ***6 sec***

RECOMMENDATIONS

Use to keep one user from continuously transmitting and thus not allowing other conversations to occur. If you have problems with users abusing the channel, then you might use this!

SEE ALSO

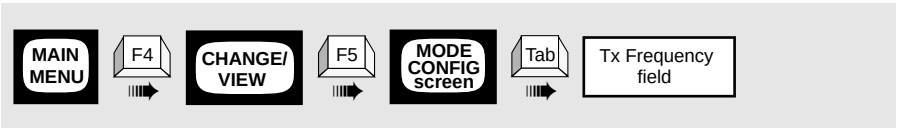
Time-Out Timer

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select the desired TOT Rekey Time value.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	
3. At the RADIO WIDE CONFIGURATION screen, press **Tab** (or **Enter** or **Return**) key until the TOT Rekey Time field is highlighted.	

Tx Frequency

RSS LOCATION



DEFINITION A designated frequency in MHz for sending outgoing messages and signals from the radio.

DEFAULT/CHOICES See Motorola catalog, price sheets or your service manual for valid Tx frequencies.

RECOMMENDATIONS If you want a receive-only frequency, enter B, and transmit frequency will display blank.

A "talk-around" frequency is entered by making the Tx frequency equal to the Rx frequency.

If you type an invalid frequency, you'll hear a beep, and the original frequency returns.

SEE ALSO Rx Frequency, Tx Squelch Code and Tx Squelch Type

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) key until the Tx Frequency field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Type in the desired Tx Frequency in MHz. Be sure to type in the decimal point too. (You can scroll the list too.)
3. At the MODE CONFIGURATION screen, select the mode number for which you want to program the desired Tx Frequency by pressing either the **F3** or **F4** keys until the desired mode # is displayed in the Name field.	6. To change the Tx Frequency on other modes, repeat steps 3-5.

Tx Inhibit On Busy

RSS LOCATION

DEFINITION Disables transmit while carrier is present on channel (channel is busy). A busy tone will be heard when the PTT is pressed.

DEFAULT/CHOICES **Default: N**

Choices: ■ ***Y*** ■ ***N***

DEPENDENCIES Receive squelch type is equal to carrier squelch.

EXCEPTIONS Does not apply when receive squelch type is not equal to carrier squelch, therefore it is not compatible with Busy Channel Lockout.

RECOMMENDATIONS Use when channel is shared by several users. Prevents accidentally transmitting on top of other users. Pressing PTT when a carrier is present causes the radio to generate a busy tone. Compatible with RapidCall signalling and scan.

WARNINGS Not compatible with TPL or DPL receive channels. May cause operational difficulties when talking through repeater systems.

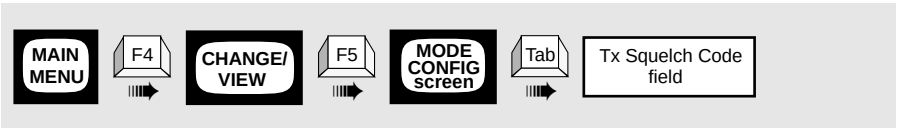
SEE ALSO Busy Channel Lockout.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Tx Inhibit On Busy field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Tx Inhibit On Busy value.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to change the Tx Inhibit On Busy value by either the **F3** or **F4** keys until the desired mode number is displayed in the Name field.	6. To change the Tx Inhibit On Busy value on other modes, repeat steps 3-5.

Tx Squelch Code

RSS LOCATION



DEFINITION

The subaudible code the radio will transmit. Allows for more users and privacy on a frequency. Receiver unmutes when code is detected.

DEFAULT/CHOICES

Default: **BLANK**

Choices: ■ ***see TPL/DPL tables (Appendix C) or press F1 to display help***

If the Tx Squelch Type = **TPL**, then enter a frequency in hertz (Hz) or any 2-digit PL code from Appendix C.

If Tx Squelch Type = **DPL** or **INV.DPL**, type a 3-digit numeric code from the table in Appendix C.

DEPENDENCIES

Tx Squelch Type and Tx Frequency

EXCEPTIONS

If a Tx Squelch Type = CARRIER SQUELCH or Tx Frequency = blank, then this field is not available.

RECOMMENDATIONS

Use when you want to have multiple groups using same frequency or when you want more privacy.

IMPORTANT NOTE

TPL tones above 220 Hz will have more bleed-through to the speaker. DPL code 645 is a reserve code and will have a greater false opening probability. TPL codes near 120 Hz and 180 Hz have a high false opening probability due to 60 Hz AC power harmonies. Countries having 50 Hz AC power may have false opening on 100 Hz (code 1Z) and 150 Hz. TPL 134Hz can be false-opened by DPL dekey.

SEE ALSO

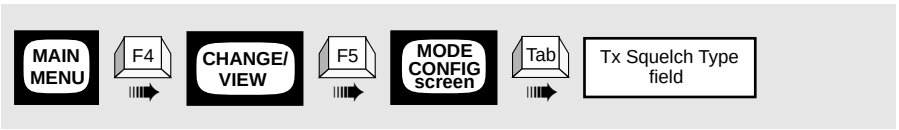
Tx Squelch Type, Tx Frequency

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) until the Tx Squelch Code field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Tx Squelch Code.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to program the desired Tx SQUELCH Code by pressing either the **F3** or **F4** keys until the desired mode # is displayed in the Name field.	6. To change the Tx Squelch Code on other modes, repeat steps 3-5.

Tx Squelch Type

RSS LOCATION



DEFINITION Determines the form of continuous subaudible code the radio will transmit.

DEFAULT/CHOICES **Default:** **CSQ**

Choices: ■ ***CSQ*** ■ ***TPL*** ■ ***DPL*** ■ ***INV.DPL***

CSQ Carrier Squelch. For receiver to unmute all carriers, transmit no specific signal.

TPL If you want the receiver to unmute only specific carriers with specific codes, use TPL or DPL. For TPL you can type either the frequency in MHz or a 2-digit tone code (see Appendix C).

DPL If you want the receiver to unmute only specific carriers with specific codes, use TPL or DPL. For DPL, enter a 3-digit tone code (see Appendix C).

INV.DPL Inverted DPL is only needed if a customer's system has an audio path "flipped".

DEPENDENCIES Tx Frequency

EXCEPTIONS When Tx Frequency = blank, this field is not available.

RECOMMENDATIONS Use when you want to have multiple groups using same the frequency or when you want more privacy.

WARNINGS Do not use Inverted DPL (INV.DPL) for new systems! Inverted DPL is needed only for special applications, such as a "flipped" audio path or a multi-hop repeater.

SEE ALSO Tx Squelch Code, Tx Frequency

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** (or **Enter** or **Return**) key until the Tx Squelch Type field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F5** to get to the MODE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Tx Squelch Type.
3. At the MODE CONFIGURATION screen, select the mode number for which you want to program the desired Tx Squelch Type by pressing either the **F3** or **F4** keys until the desired mode # is displayed in the Name field.	6. To change the Tx Squelch Type on other modes, repeat steps 3-5.

5 Scanning Features

5.1 Overview

Only one feature or function is shown on a page. On each reference page you will find a standard page layout with consistent categories of information. Below is a list and explanation of all the categories. The categories marked with an asterisk (*) appear on every reference page. The other categories appear only when they apply to the specific feature.

- **FEATURE NAME*** Identifies the name of the reference feature.
- **RSS LOCATION*** Provides a quick visual map of where you'll find a particular feature within the RSS, showing the keys to press to arrive at the feature's or function's screen location. More details of this map follow in the PROGRAMMING PROCEDURE section.
- **DEFINITION*** Summarizes the feature's function - it defines and briefly explains the feature.
- **DEFAULT/CHOICES*** Identifies and explains both the default value the feature is automatically set to (with no user input) and the other available choices a user can select.
- **DEPENDENCIES** Identifies items that have a direct impact or influence upon the feature.
- **EXCEPTIONS** Identifies when the general rules concerning a feature may not apply.
- **RECOMMENDATIONS** Provides advice for the most common applications and usages, and informs you when things work best.
- **WARNINGS** Identifies areas of caution and important concerns. Be sure to read and act upon warnings. They are more serious in nature than IMPORTANT NOTES.
- **IMPORTANT NOTES** Explains other tips to consider.
- **PROGRAMMING PROCEDURES*** Summarizes how to access and change a given feature. It explains the RSS LOCATION mapping in more detail.

5.2 Scan Features

The following reference pages describe the various Scan Features available.

Priority Channel Tone

RSS LOCATION

DEFINITION Whenever the radio's scan stops on a priority channel, a short tone can be sounded. Enabling the tone draws the user's attention to a message of high importance.

DEFAULT/CHOICES **Default: N**

Choices: ■ ***Y*** ■ ***N***

DEPENDENCIES Applies to all scan lists (user and mode-slaved).

RECOMMENDATIONS Enable when customer requests. Not used in conjunction with 8-channel radios.

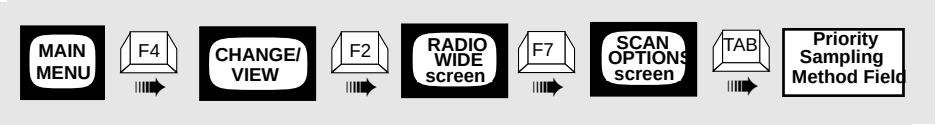
WARNINGS Enabling the tone can cause a loss of 100 ms of the priority channel audio.

PROGRAMMING PROCEDURE

1. Press F4 at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the Priority Channel Tone field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Priority Channel Tone option.
3. At the RADIO WIDE CONFIGURATION screen, press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

Priority Sampling Method

RSS LOCATION



DEFINITION

Determines the way in which the priority channel(s) is checked for activity during a "lookback" from an active second priority or non-priority channel.

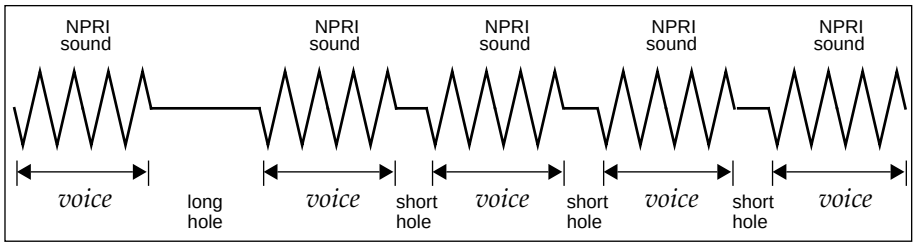
DEFAULT/CHOICES

Default: Continuous

Choices: ■ ***Continuous*** ■ ***1-SHOT PL***

Continuous Continuous always performs a complete check of the channel. If no carrier is present, then the sampling ends. If a carrier is present, a full PL check is made on each sample.

1-Shot PL For 1-Shot PL, once a carrier is seen, a full PL sample is only done once until a sample is seen with no carrier present (that is, a carrier "break"). See PIX.



RECOMMENDATIONS

Almost always use Continuous. Use 1-Shot PL to reduce hole size on shared channels (for example, community repeaters, timeouts). Your best advantage occurs if you reduce the priority sampling rate when using 1-Shot PL.

WARNINGS

There is a risk that messages will be lost on the priority channel. Use Continuous for critical priority channels (public safety, etc.).

IMPORTANT NOTE

Best performance of 1-Shot PL is attained on a well-controlled channel, since a wide carrier break is needed to reduce lost priority activity. Your repeater panel may have an access timer that will help. Busy Channel Lockout on all radios will help.

SEE ALSO

Busy Channel Lockout, Priority Sampling Rate

PROGRAMMING PROCEDURE

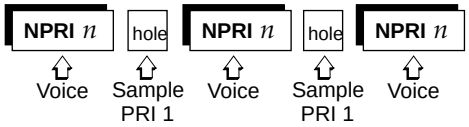
1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the Priority Sampling Method field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Priority Sampling Method.
3. At RADIO WIDE CONFIGURATION, press **F7** to get to theRADIO-WIDE SCAN OPTIONS screen.	

Priority Sampling Rate

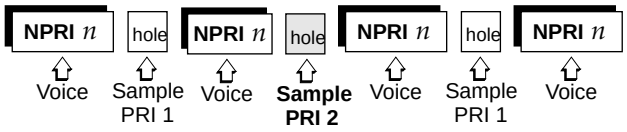
RSS LOCATION

DEFINITION

Determines how often the priority channel is sampled for activity when listening to priority 2 or non-priority channels. This sampling process is known as "look-back" and causes holes in received audio. The time chosen determines the length of time between samples. The following picture shows the sequence information.



Single Priority "Lookback" Sequence



Dual Priority "Lookback" Sequence

DEFAULT/CHOICES

Default: **0.9 seconds**

Choices: ■ ***0.5 seconds to 4.0 seconds***

RECOMMENDATIONS

Only used when list has priority channels. Applies to user scan lists also. The best choice is always a compromise between probability of missed syllables on the priority channel and intelligibility of the lower priority channel. Each customer's preference may be different. For critical use (public safety, etc.) we suggest the fastest choice.

SEE ALSO

Priority Sampling Method, and Appendix Timing diagrams

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the Priority Sampling Rate field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select or directly type in the desired Priority Sampling Rate.
3. At the RADIO WIDE CONFIGURATION screen press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

Priority 2 Mode

RSS LOCATION

DEFINITION

A mode-slaved scan list can be either non-priority, single-priority, or dual-priority. In the case of dual-priority, the second priority is defined once for all mode-slaved scan lists. The mode number entered will be the only available Priority 2 channel in any mode-slaved scan list

DEFAULT/CHOICES

Default: **Off**

Choices: ■ ***Any channel in radio or OFF***

EXCEPTIONS

Not available on 8-channel models..

RECOMMENDATIONS

Leave at default unless the application requires a specific second priority channel. Should a user want a "dynamic" second priority, implement "user-scan" instead.

SEE ALSO

User Scan List

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU screen.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the Priority 2 Mode field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select or directly type in the desired Priority 2 Mode.
3. At the RADIO WIDE CONFIGURATION screen press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

Scan Hang Time

RSS LOCATION

DEFINITION Determines how long the radio will remain on the channel after receiving the end of a transmission or after releasing PTT.

DEFAULT/CHOICES **Default:** **2.5 seconds**

Choices: ■ ***0.0 - 4.1 seconds***

DEPENDENCIES Applies to all scan lists (user and mode-slaved).

RECOMMENDATIONS The hang time provides both received message continuity and allows the user time to "grab the microphone" to respond to a received message. Some systems, such as split simplex, require a zero hang time to hear both sides of a conversation.

IMPORTANT NOTE During the hang time, the radio remains on the last active channel.

SEE ALSO Scan Talkback

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the Scan Hang Time field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION.	5. Use the ↑ ↓ arrow keys to select or directly type in the desired Scan Hang Time.
3. At the RADIO WIDE CONFIGURATION screen press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

Scan Nuisance Delete

RSS LOCATION	*NOT PROGRAMMABLE WITH THE RSS*
DEFINITION	When listening to an active channel, it may be temporarily deleted from the scan list by the user. User holds SELECT for 2 seconds. The channel returns to the scan list upon exiting/re-entering scan, or cycling radio off/on.
DEPENDENCIES	Home channels and priority channels cannot be deleted.
IMPORTANT NOTE	No RSS programming is required/available.

Scan Speed

RSS LOCATION

DEFINITION

Determines how long each channel is checked for carrier and PL. Allows adjustment for radio hardware improvements and customer preference.

DEFAULT/CHOICES

Default: Normal

Choices: ■ ***Fast*** ■ ***Normal*** ■ ***Slow***

Normal Most customers will use Normal.

Fast Fast risks a loss of carrier detect, degrading the range. Fast is most applicable when Rx frequencies are less than 5 MHz. Fast should only be used where strong signal conditions exist.

Slow Slow is the most reliable and does not affect sensitivity.

SEE ALSO

Appendix E - Timing Diagrams.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen press **Tab** (or **Enter** or **Return**) until the Scan Speed field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Scan Speed.
3. At the RADIO WIDE CONFIGURATION screen, press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

Scan Talkback

RSS LOCATION

DEFINITION Determines which channel the radio will revert to when either the microphone is taken off hook or transmits while the scanner has stopped (hanging) on activity.

DEFAULT/CHOICES **Default:** **N**

Choices: ■ ***Y*** ■ ***N***

Y If Scan Talkback is enabled (Y), the radio will remain on the currently active channel when transmitting and/or mic is taken off hook.

N If disabled (N), then the radio will revert to the home channel.

DEPENDENCIES Applies to all scan lists (user and mode-slaved).

EXCEPTIONS Does not affect radio operation when scanning with no activity present (scan bars on the display). In such circumstances the radio always reverts to the home channel.

RECOMMENDATIONS Enable talkback for most customers; disable when most channels are being scanned for receive-only purposes. Some public safety users prefer to disable Scan Talkback.

SEE ALSO Scan Hang Time.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the Scan Talkback field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION screen.	5. Use the ↑ ↓ arrow keys to select the desired Scan Talkback option.
3. At the RADIO WIDE CONFIGURATION screen, press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

User Pri 2 Allowed

RSS LOCATION

DEFINITION The second priority feature of the user scan list can be disabled.

DEFAULT/CHOICES **Default:** **N**

Choices: ■ ***Y*** ■ ***N***

N If customer only needs one priority, then leave disabled.

Y Allows programming of user scan priority 2.

RECOMMENDATIONS To simplify user operation, choose N (disabled) so operator can only select one priority channel in the user scan.

SEE ALSO Priority Sampling Rate.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. At the RADIO-WIDE SCAN OPTIONS screen, press **Tab** (or **Enter** or **Return**) until the User PRI 2 Allowed field is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO WIDE CONFIGURATION.	5. Use the ↑ ↓ arrow keys to select the desired User PRI 2 Allowed.
3. At the RADIO WIDE CONFIGURATION screen, press **F7** to get to the RADIO-WIDE SCAN OPTIONS screen.	

User Scan List

RSS LOCATION *NOT PROGRAMMABLE WITH THE RSS*

DEFINITION Each radio can have a single user-programmed scan list. The list is edited via the front panel of the radio. The RSS cannot view or change the user list.

Hold the SCAN button on the radio for 2 seconds; the display will flash. A vertical bar in the upper left corner indicates a channel is in the user list. Press SELECT to add/delete. An extended hold of SELECT sets the priority channel. Press SCAN to save the list. You may blank the user list by deleting all channels as described above.

DEFAULT/CHOICES **Default: Blank list**

WARNINGS The user scan list is erased by the RSS each time the radio is reprogrammed.

SEE ALSO Mode Slaved Scan List (next issue), Scan Nuisance Delete, User PRI 2 Allowed.

6 Accessory Connector

(16 Channel Models Only)

6.1 Overview

The Expanded Accessory Connector has six programmable I/O pins to allow it to adapt to various accessories for the 16 channel model. For ease of programming, commonly used accessories have their pin functions predefined and can be programmed on one data field. Some accessories will need to be programmed on a pin by pin basis. The Radio Service Software provides screens for customizing your application pin by pin.

6.2 Customizing the Expanded Accessory Connector

The Expanded Accessory Connector's pin functions may be modified on the ACCESSORY CONNECTOR CONFIGURATION screen. This screen is displayed when the function key F9 is pressed on the RADIO WIDE CONFIGURATION screen. Customizing the Expanded Accessory Connector is necessary when more than one accessory requires programmable functions or a nonstandard accessory. The screen also contains useful information on the characteristics of each function. These are:

- ❏ Data Direction

  Indicates whether the information is to or from the radio. OUTPUT means that the data comes from the radio. INPUT means that the data comes from the accessory. Mismatching the Data Direction with the accessory may result in damage to the radio or accessory or both. Therefore, use caution when selecting functions for nonstandard accessories. The direction is determined by the selected function and is not programmable.
- ❏ Debounce

  Determines whether the radio waits a short period of time before acting. This is done to make sure that any mechanical switch bounce is accounted for. This parameter is programmable.
- ❏ Active Level

  Determines whether a high voltage or low voltage means to “do something”. This parameter is programmable.

Note: The same function (except NULL and CHANNEL STEERING) should NEVER be assigned to more than one pin on the connector. Also ALWAYS verify the levels and polarities of the signals prior to connecting any custom accessory to the connector.

Each programmable pin on the Expanded Accessory Connector has a limited number of functions that could be assigned to it. There are two type of functions: independent and dependent. Dependent functions cannot be reprogrammed. They are dependent on the assigned pin when used with the selected accessory. Independent functions can be reprogrammed to different pins.

Table 6-2 on page 6-19 lists the input functions and Table 6-3 on page 6-20 lists the output functions. Both tables give the type of function and a short description. For details on each function refer to the RapidCall Planning Guide. Each function has a function number assigned to it. This number is used to assign a function to a pin. The Accessory Input and Output Function tables can be used to determine which functions are necessary for your application. Table 6-4 on page 6-21 defines what functions can be assigned to each pin. Using the tables and the ACCESSORY CONNECTOR CONFIGURATION screen, you should be able to configure the accessory connector to suit your application.

6.2.1 Accessory Connector Packages

The table below list packages that are available for customizing the Expanded Accessory Connector. A description and programming procedure for each of the packages *not* marked with an asterisk (*) are given in this chapter. Descriptions for the packages marked with an asterisk (*) can be found in the GR300 Repeater Station Manual.

Table 6-1. Accessory Connector Packages

Community PA *	Public Address
Community Rmt *	Radius RICK-Tx *
DTMF Decoder Board (internal only)	Radius RICK-RX *
General I/O	Remote
Paging Encoder	RPB50 Interface
Phone Base PA-Tx *	Phone Remote PA-Tx *
Phone Base PA-Rx *	Phone Remote PA-Rx *
Phone Base Rmt-Tx *	Phone Remote Rmt-Tx *
Phone Base Rmt-Rx *	Phone Remote Rmt-Rx *
Phone Patch	

(*) can be found in the GR300 Repeater Station Manual

Active Level

RSS LOCATION

DEFINITION

The programmable pins are binary. They become active on either a high or low voltage signal. Some non-standard accessories may not have the same active level as the defaults.

DEFAULT/CHOICES

Default: **See Accessory Package default tables in Appendix H.**

Choices: ■ *High* ■ *Low*

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** or **Enter/Return** until the Active Level field for the desired pin is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. Use the ↑ ↓ arrow keys to select the desired choice.
3. Press **F9** to enter the ACCESSORY CONNECTOR CONFIGURATION screen.	

Custom

6

RSS LOCATION

Not Programmable with the RSS

DEFINITION

This indicates that the default package has been used in a modified fashion for this radio. For example, changing a pin function, Debounce, and/or Active Level will cause the radio to be "custom".

DEFAULT/CHOICES

Default: **See Accessory Package default tables in Appendix H.**

Choices: ■ *Y* ■ *N*

IMPORTANT NOTE

No RSS programming is required/available.

Data Direction

RSS LOCATION

Not Programmable with the RSS

DEFINITION

This indicates whether the information is an input or output to the radio. Input is data that comes from the accessory. Output is data that comes from the radio. The data direction is determined by the selected function and is not programmable.

WARNING

Mismatching the Data Direction with the accessory may result in damage to the radio or the accessory. Therefore, use caution when selecting functions for non-standard accessories.

IMPORTANT NOTE

No RSS programming is required/available.

Debounce

RSS LOCATION

DEFINITION

Debounce determines whether the radio waits a short period of time before acting. This is to account for any mechanical switch bounce. It applies only to inputs and is usually required for pins that are driven by relays or other mechanical devices.

DEFAULT/CHOICES

Default: **See Accessory Package default tables.**

Choices: ■ ***Yes*** ■ ***No***

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** or **Enter/Return** until the Debounce field for the desired pin is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. Use the ↑ ↓ arrow keys to select the desired choice.
3. Press **F9** to enter the ACCESSORY CONNECTOR CONFIGURATION screen.	

DTMF Decoder Board (internal only)

RSS LOCATION

DEFINITION This internal accessory provides DTMF decode capabilities in the radio. It is an internal board that must be installed before the radio accessory connector is programmed.

DEFAULT/CHOICES Please refer to *Table 10-17 on page 10-13*, *Table 10-20 on page 10-14*, and *Table 10-22 on page 10-14* in Appendix H for defaults

EXCEPTIONS When this internal accessory is installed, the external accessory packages that can be used are Public Address, Remote, and General I/O.

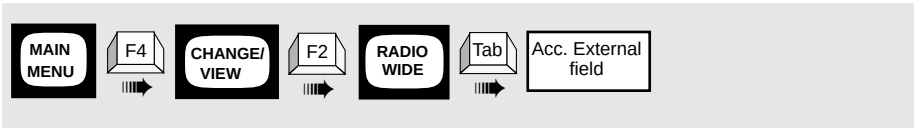
SEE ALSO Internal Accessories

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	5. A popup warning asks if you have installed the internal option board in the radio. If YES, press **F2**. If NO, press **F10** and install the internal DTMF decoder option board.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	6. If the External Accessory has been set to something other than Public Address, Remote, or General I/O, another popup warning will appear. You must **Tab** to the External Accessory field and change the value to a compatible type.
3. Press **Tab** or **Enter/Return** until the Acc. Internal field is highlighted.	7. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
4. Use the ↑ ↓ arrow keys to select DTMF.	

External Accessories

RSS LOCATION



OR

DEFINITION

Refers to the External Accessory that is connected to the radio via the Expanded Accessory Connector.

DEFAULT/CHOICES

Default: **See Accessory Package default tables in Appendix H.**

Choices: ■ *Public Address* ■ *Remote* ■ *General I/O*

■ *Phone Patch* ■ *Paging Encoder* ■ *RPB50 Interface*

See Table 6-1 on page 6-2 for the available repeater packages.

SEE ALSO

Public Address, Remote, General I/O, Phone Patch, Paging Encoder, RPB50 Interface

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	**OR**	1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.		2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.
3. Press the **Tab** or **Enter/Return** key until the Acc.External field is highlighted.		3. Press **F9** to enter the ACCESSORY CONNECTOR CONFIGURATION screen.
4. Use the ↑ ↓ arrow keys to select the desired choice.		4. Pres **F3** or **F4** to select the previous or next external package.

6

Function Description

RSS LOCATION

DEFINITION

This refers to the functions that can be assigned to the programmable pins on the Expanded Accessory Connector. There are two types of functions: Dependent and Independent. Dependent functions cannot be reprogrammed. They are dependent on the assigned pin when used with the selected accessory. Independent functions can be reprogrammed to other pins in any package. *Table 6-2 on page 6-19* and *Table 6-3 on page 6-20* list the available INPUT and OUTPUT functions and whether they are independent or dependent.

DEFAULT/CHOICES

Default: See Accessory Package default tables.

WARNING

The same function (except NULL and CHANNEL STEERING) should NEVER be assigned to more than one pin on the connector. Also, always verify the levels and polarities of the signals prior to connecting any custom accessory to the connector pins.

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select the desired function.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	
3. Press **F9** to enter the ACCESSORY CONNECTOR CONFIGURATION screen.	

General I/O

RSS LOCATION

DEFINITION Designed to give the user the flexibility needed to support other accessories not covered under the predefined packages. There are no dependent functions, which leaves all pins open to be assigned an independent function of the user's choice.

DEFAULT/CHOICES Refer to Appendix H for Accessory Package defaults.

SEE ALSO External Accessories, Internal Accessories, DTMF Decoder Board

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select General I/O.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
3. Press **Tab** or **Enter/Return** until the Acc. External field is highlighted.	

Internal Accessories

RSS LOCATION

DEFINITION Refers to the accessories that are physically placed inside the radio and do not actually use the connector. Connections are made internal to the radio, but still use the pin functions.

DEFAULT/CHOICES **Default: None.**

Choices: ■ ***None*** ■ ***DTMF***

DEPENDENCIES External Accessory MUST be Public Address, Remote, or General I/O in order to select the DTMF Internal Accessory.

IMPORTANT NOTE The Internal Accessory should be installed in the radio before programming.

SEE ALSO External Accessories, DTMF Decoder Board

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select the internal accessory.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. A popup warning asks if you have installed the internal option board in the radio. If YES, press **F2**. If NO, press **F10** and install the internal option board before proceeding.
3. Press **Tab** or **Enter/Return** until the Acc. Internal field is highlighted.	6. If the External Accessory has been set to something other than Public Address, Remote, or General I/O, another popup warning will appear. You must **Tab** to the External Accessory field and change this field to one of the acceptable external packages.

Paging Encoder

RSS LOCATION

DEFINITION

This package allows the microphone to remain plugged into the front of the radio with the modem connected to the rear of the radio. This package was designed to be used with the Modem 100 which was produced by Motorola. This package can be used with a variety of Motorola or third party paging encoders.

DEFAULT/CHOICES

Refer to *Table 10-24 on page 10-15* in Appendix H for defaults.

IMPORTANT NOTE

Incompatible with DTMF Decoder Board.

SEE ALSO

External Accessories, DTMF Decoder Board, Internal Accessories

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select Paging Encoder.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
3. Press **Tab** or **Enter/Return** until the Acc. External field is highlighted.	

Phone Patch

RSS LOCATION

DEFINITION The phone patch interface package was designed for the i50x phone patch, but can be used with a variety of Motorola and third party phone patches.

DEFAULT/CHOICES Refer to Table 10-23 on page 10-14 in Appendix H for defaults.

DEPENDENCIES The Internal Accessory MUST be set to NONE.

IMPORTANT NOTE Incompatible with DTMF Decoder Board.

RECOMMENDATIONS To avoid any transients that may occur while turning on the radio, we suggest that the power-up delay be at least 500ms.

SEE ALSO External Accessories, Internal Accessories, DTMF Decoder Board

PROGRAMMING PROCEDURE

1. Press F4 at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select Phone Patch. If the choice does not appear, check that the Internal Accessory is set to NONE.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
3. Press **Tab** or **Enter/Return** until the Acc. External field is highlighted.	

Pin

RSS LOCATION

Not Programmable with the RSS

DEFINITION

This refers to the programmable pins on the Expanded Accessory Connector. Pins can be INPUT and/or OUTPUT. Each programmable pin has a limited number of functions that can be assigned to it. Pin numbers can not be programmed or changed. Only the functions tied to pins can be changed. There are two types of functions: Dependent and Independent. Dependent functions cannot be reprogrammed. They are dependent on the assigned pin when used with the selected accessory. Independent functions can be reprogrammed. Table 6-4 lists the input & output capabilities of each pin, and the independent functions that can be assigned to the various pins.

SEE ALSO

Function Descriptions

Power-Up Delay

RSS LOCATION

DEFINITION

This is the time during which the radio ignores the active levels on the programmable input pins in order to allow the accessory device time to initialize itself.

DEFAULT/CHOICES

Default: **0.255 seconds**

Choices: ***0.0 - 4.3 seconds***

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Press **Tab** or **Enter/Return** until the Power-Up Delay field for the desired pin is highlighted.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. Use the ↑ ↓ arrow keys to select the desired choice.
3. Press **F9** to enter the ACCESSORY CONNECTOR CONFIGURATION screen.	

Public Address

RSS LOCATION

DEFINITION This package is designed for use with public address systems. The speaker output is routed to the public address system. In addition, transmit capability is such that the broadcaster's voice is only heard on the public address speaker system.

DEFAULT/CHOICES Refer to *Table 10-17 on page 10-13* in Appendix H for defaults.

IMPORTANT NOTE Public Address can also be installed on 8-channel model radios.

SEE ALSO External Accessories, Internal Accessories, DTMF Decoder Board

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select Public Address.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
3. Press **Tab** or **Enter/Return** until the Acc. External field is highlighted.	

Remote

RSS LOCATION

DEFINITION This package is designed for applications where the radio will be remotely controlled. This might be an extended local deskset, DC remote deskset, tone remote deskset, or a second microphone.

DEFAULT/CHOICES Refer to *Table 10-19 on page 10-13* in Appendix H for defaults.

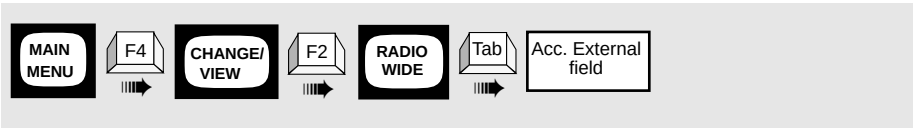
SEE ALSO External Accessories, Internal Accessories, DTMF Decoder Board

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. Use the ↑ ↓ arrow keys to select Remote.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	5. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
3. Press **Tab** or **Enter/Return** until the Acc. External field is highlighted.	

RPB50 Interface

RSS LOCATION



DEFINITION This paging-based interface is designed for the RPB50.

DEFAULT/CHOICES Refer to *Table 10-25 on page 10-15* in Appendix H for defaults.

IMPORTANT NOTE Incompatible with DTMF Decoder Board.

SEE ALSO External Accessories, Internal Accessories, DTMF Decoder Board

PROGRAMMING PROCEDURE

1. Press **F4** at the MAIN MENU to get to the CHANGE/VIEW CODEPLUG MENU.	4. To customize the accessory package, press **F9** to get to the ACCESSORY CONNECTOR CONFIGURATION screen and make the desired changes.
2. At the CHANGE/VIEW CODEPLUG MENU, press **F2** to get to the RADIO-WIDE screen.	
3. Press **Tab** or **Enter/Return** until the Acc. External field is highlighted.	

6.3 Accessory Connector Function Tables

Table 6-2. Accessory Connector Input Functions

Function	Function Type	Description
NULL1	Independent	Pin has no function
Emergency Switch	Independent	Connection to emergency switch for RapidCall
PA Switch	Dependent	Inhibits PTT for Public Address
Tx PL Inhibit	Independent	When active, the radio strips PL from any transmission
TOC Disable	Independent	When active, disables TPL/DPL turn off code at the end of Tx
Mic Off Hook	Independent	Indicates to radio when a remote microphone is off hook
Page PTT	Dependent	PTT for paging or data encoders using flat Tx audio
Tx Audio Mute	Independent	When active, inhibits microphone audio from being sent
Data Ready	Dependent	Input from DTMF decoder board
DTMF Data	Dependent	Input from DTMF decoder board
Rx Audio Mute	Independent	Mutes received audio for data applications
Special Off Hook	Independent	Same as I/O Off Hook but also readies audio amplifier to accept externally generated sidetones
Channel Select 1	Independent	BCD channel selector input (all released: operator's channel). Least significant bit.
Channel Select 2	Independent	BCD channel selector input (all released: operator's channel)
Channel Select 3	Independent	BCD channel selector input (all released: operator's channel)
Channel Select 4	Independent	BCD channel selector input (all released: operator's channel)
Channel Select 5	Independent	BCD channel selector input (all released: operator's channel). Most significant bit.
External Call Button	Independent	Transmits a specified encode sequence
Auto PTT	Independent	Strips PTT ID and system busy alert tone
Request-To-Send	Independent	Strips PTT ID (except for Select V) and executes a PL strip and a TOC disable

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Table 6-3. Accessory Connector Output Functions

Function	Function Type	Description
NULL2	Independent	Pin has no function
External Alarm	Independent	Driver pin for external relay when an Alert is received
PL/DPL & CSQ Detect	Independent	Pin is active when TPL/DPL and carrier are detected
CSQ Detect	Independent	Pin is active when a carrier is detected by the radio
Data Clock Out	Dependent	Output to the DTMF Decoder board
Phone Patch Inhibit	Dependent	Output to inhibit the phone patch when radio is handling priority activity
Clear-To-Send	Independent	Handshake with RTS to communicate with external device; audio path is ready

Table 6-4. Possible Pin Assignments

Pin	Function
4 (Output)	External Alarm NULL2 PL/DPL & CSQ Detect CSQ Detect Clear to Send
6, 9 (Input)	NULL1 Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute RX Audio Mute Special Off Hook Channel Select 1-5 Mic Off Hook Auto PTT Request to Send Ext. Call Button
8, 12, 14 (Input & Output)	External Alarm (*low current drive on these pins)* NULL1 PL/DPL & CSQ Detect CSQ Detect Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute Clear to Send Rx Audio Mute Special Off Hook Channel Select 1-5 Mic Off Hook Auto PTT Request to Send Ext. Call Button NULL2